WBS	Name	Cost
		\$0.00
		##########
1.1	Run 2b Silicon Project	\$13,616,229

Notes

Table summarises the number of parts needed to the project:

Layer	Type	Ф-seg.	Z-seg.	Length	Width	Pitch	Total
5	A	30	6	96.4	40.5	75/37.5	360
5	Α	30	6	96.4	40.5	75/37.5	360
4	Α	24	6	96.4	40.5	75/37.5	288
4	2.5°	24	6	96.4	43.1	80/40	288
3	A	18	6	96.4	40.5	75/37.5	216
3	2.5°	18	6	96.4	43.1	80/40	216
2	A	12	6	96.4	40.5	75/37.5	144
2	2.5°	12	6	96.4	43.1	80/40	144
1	A	6	6	96.4	40.5	75/37.5	72
1	A	6	6	96.4	40.5	75/37.5	72
0	A	12	6	96.4	14.8	50/25	144

	Sensors	Modules	Staves	4-chips hybrids	2-chips hybrids	MPC	JPC
Outer Axials Outer Stereo	1512 648	756 324	180	1080	0	180	40
L0	144	72	0	0	72	0	16
TOTAL	2304	1152	180	1080	72	180	56

1.1.1	DAQ \$6,099,195
1.1.1.1	SVX4 Chips \$1,071,335

Notes

Runs:

- 1. Prototype (Hybrid #1)
 2. Contingency (Hybrid #2)
 3. Production (Preproduction and Production hybrids)

Need 4,464 chips for the project

WBS			Name	.			Cost							
1.1.1.1.1					1st chip	o: layout	\$135 _.	880						
ID	Resource Name	Units	Work	c De	lay Start	t Finis	h	Cost	Baseline	e Cost	Act.	Cost R	Rem. Cost	
2	FNALR&D	0%	0 H	nrs 0 d	ays Mon 7/2	2/01 Mon 7/2	2/01 \$	88,014		\$0		\$0	\$88,014	_
4	ItalyEQ	0%	0 ł					25,000		\$0		\$0	\$25,000	
7	Elect. Engineer	30%	448.8 h		,			22,866		\$0		\$0	\$22,866	
16	NonFnal Labor	100%	1,496 h	nrs 0 d	ays Mon 7/2	2/01 Mon 4/	1/02	\$0		\$0		\$0	\$0	
	es													
This is project \$241,(Labor: LBL pr FNAL INFN-	Notes Cost: This is labor cost at LBL as from Henrik Van Der Lippe project file svx4_0202.mpp of March 20 2002: \$241,028 to be equally split between CDF and D0. Labor: LBL provided an equivalent of 1 engineer for ~1.6 years to the project (Costed as R&D) FNAL provided an equivalent of 1 engineer for ~3 months on the project (Costed as Labor) INFN-Padova provided 1 engineer for ~1 year on the project (Not Costed) 1.1.1.1.2 1st Chip submission (eng. Run) \$0													
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	•	ne Cost	Act. C	ost	Rem. Co	st	
2	FNALR&D	100%	0 hrs	0 days	Mon 4/1/02		\$0		\$0	7.00. 0	\$0		BO 0	
						(not equally divide	ed).							
1.1.1.3					t chip: docum		, \$15,	000						
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Base	eline Cost	Act.	Cost	Rem. C	Cost	
2	FNALR&D	0%		0 days	Mon 4/1/02	Mon 4/1/02	\$7,50		\$0		\$0		500	
3	FNALCont	0%	0 hrs	0 days	Mon 4/1/02	Mon 4/1/02	\$7,50	0	\$0		\$0	\$7,	500	
_Not	es													
Labor:														
I NIS IS	labor at LBL associated	with produ	cing the ne	cessary do	cumentation for th	ie cnip.								
1.1.1.1.4				1s	t Chip: manuf	acturing	\$58,	000						
ID	Resource Name	Units	Work	Delay	Start	Finish	Cos		seline Cos		. Cost			
2	FNALR&D	0%	0 hrs	0 days	Mon 4/1/02	Mon 4/1/02	\$58,0	00	\$(0	\$0	\$58	3,000	
Not	es													

Schedule:

8 weeks for fabrication at TSMC

Not	tes									
Cost:	.: 000l/fb / 40 /									
	ost is 200K\$ for 10 wafer for CDF is 50K\$ for mask			nis order is s	plit between CDF, L	00 and BTeV				
							# 40.000			
1.1.1.1.5					Chip: postprod	•	\$10,000			
_ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	FNALR&D	0%	0 hrs	0 days	Tue 5/28/02	Tue 5/28/02	\$5,000	\$0	\$0	\$5,000
3	FNALCont	0%	0 hrs	0 days	Tue 5/28/02	Tue 5/28/02	\$5,000	\$0	\$0	\$5,000
Not	tes									
Sched										
2 wee Cost:	ks for backgrounding, ba	ckplating a	nd dicing							
	is 15K\$ (Engineering Est	imate). CD	F part is 5	K\$						
						. = 1.1.	00 4 50			
1.1.1.1.6			•	•	ng evaluation a		\$8,152			
_ID	Resource Name	Units	Work		,	Finish				
7	Elect. Engineer	100%	160 hi	rs 0 day	s Wed 6/12/	02 Wed 7/10	/02 \$8,1	52	\$0	\$0 \$8,152
Not	tes									
Labor	= -									
	: s FNAL labor only. It inclu	uded engin	nering type	e tests.						
This is	= -	uded engin	nering type	e tests.						
	= -				ring evaluation	at LBL	\$27,624			
This is	= -				ring evaluation Start	at LBL Finish	\$27,624 Cost	Baseline Cost	Act. Cost	Rem. Cost
This is	s FNAL labor only. It inclu		Ist Chip	: enginee	•		, ,	Baseline Cost	Act. Cost	
This is 1.1.1.1.7 ID	s FNAL labor only. It incluses FNAL labor only. It is inclused	Units	Ist Chip Work	: enginee Delay	Start	Finish	Cost			\$13,812
This is 1.1.1.1.7 ID 2 3	Resource Name FNALR&D FNALCont	Units 0%	Ist Chip Work 0 hrs	: enginee Delay 0 days	Start Tue 6/11/02	Finish Tue 6/11/02	Cost \$13,812	\$0	\$0	\$13,812
This is 1.1.1.1.7 ID 2	Resource Name FNALR&D FNALCont	Units 0%	Ist Chip Work 0 hrs	: enginee Delay 0 days	Start Tue 6/11/02	Finish Tue 6/11/02	Cost \$13,812	\$0	\$0	\$13,812
This is 1.1.1.1.7 ID 2 3 Not Labor. This is	Resource Name FNALR&D FNALCont tes is labor cost at LBL as fro	Units 0% 0%	Ist Chip Work 0 hrs 0 hrs	: enginee Delay 0 days 0 days	Start Tue 6/11/02 Tue 6/11/02	Finish Tue 6/11/02	Cost \$13,812	\$0	\$0	\$13,812
This is 1.1.1.1.7 ID 2 3 Not Labor: This is project	Resource Name FNALR&D FNALCont tes : s labor cost at LBL as fro	Units 0% 0% m Henrik V	Ust Chip Work 0 hrs 0 hrs 0 hrs	: enginee Delay 0 days 0 days	Start Tue 6/11/02 Tue 6/11/02 Yarema (3/19/02)	Finish Tue 6/11/02 Tue 6/11/02	Cost \$13,812 \$13,812	\$0 \$0	\$0 \$0	\$13,812 \$13,812
This is 1.1.1.1.7 ID 2 3 Not Labor: This is project	Resource Name FNALR&D FNALCont tes is labor cost at LBL as fro	Units 0% 0% m Henrik V	Ust Chip Work 0 hrs 0 hrs 0 hrs	: enginee Delay 0 days 0 days	Start Tue 6/11/02 Tue 6/11/02 Yarema (3/19/02)	Finish Tue 6/11/02 Tue 6/11/02	Cost \$13,812 \$13,812	\$0 \$0	\$0 \$0	\$13,812 \$13,812
This is 1.1.1.1.7 ID 2 3 Not Labor: This is project	Resource Name FNALR&D FNALCont tes : s labor cost at LBL as fro	Units 0% 0% m Henrik V	Ust Chip Work 0 hrs 0 hrs 0 hrs	: enginee Delay 0 days 0 days	Start Tue 6/11/02 Tue 6/11/02 Yarema (3/19/02)	Finish Tue 6/11/02 Tue 6/11/02	Cost \$13,812 \$13,812	\$0 \$0	\$0 \$0	\$13,812 \$13,812
This is 1.1.1.1.7 ID 2 3 Not Labor: This is project Tests	Resource Name FNALR&D FNALCont tes : s labor cost at LBL as fro	Units 0% 0% m Henrik V	Ust Chip Work 0 hrs 0 hrs 0 hrs	: enginee Delay 0 days 0 days	Start Tue 6/11/02 Tue 6/11/02 Yarema (3/19/02) ther tests including	Finish Tue 6/11/02 Tue 6/11/02 radiation damage a	Cost \$13,812 \$13,812	\$0 \$0	\$0 \$0	\$13,812 \$13,812
This is 1.1.1.1.7 ID 2 3 Not Labor. This is project Tests 1.1.1.1.8	Resource Name FNALR&D FNALCont tes : s labor cost at LBL as fro	Units 0% 0% m Henrik V March 20 2 e radiation	Ust Chip Work O hrs O hrs O hrs Can Der Lip 002. damage as	: enginee Delay 0 days 0 days	Start Tue 6/11/02 Tue 6/11/02 Yarema (3/19/02) ther tests including	Finish Tue 6/11/02 Tue 6/11/02 radiation damage a	Cost \$13,812 \$13,812 assesment will \$3,072	\$0 \$0	\$0 \$0	\$13,812 \$13,812
This is 1.1.1.1.7 ID 2 3 Not Labor. This is project Tests	Resource Name FNALR&D FNALCont tes : s labor cost at LBL as fro	Units 0% 0% m Henrik V March 20 2 e radiation	Ust Chip Work O hrs O hrs O hrs Can Der Lip 002. damage as	: enginee Delay 0 days 0 days	Start Tue 6/11/02 Tue 6/11/02 Yarema (3/19/02) ther tests including	Finish Tue 6/11/02 Tue 6/11/02 radiation damage a	Cost \$13,812 \$13,812 assesment will \$3,072	\$0 \$0	\$0 \$0	\$13,812 \$13,812
This is 1.1.1.1.7 ID 2 3 Not Labor. This is project Tests 1.1.1.1.8	Resource Name FNALR&D FNALCont tes : s labor cost at LBL as fro	Units 0% 0% m Henrik \ March 20 2 e radiation Ur	Ist Chip Work 0 hrs 0 hrs can Der Lip 002. damage as	: enginee Delay 0 days 0 days ope and Ray ssesment. O	Start Tue 6/11/02 Tue 6/11/02 Yarema (3/19/02) ther tests including	Finish Tue 6/11/02 Tue 6/11/02 radiation damage a	Cost \$13,812 \$13,812 assesment wil \$3,072 hish	\$0 \$0	\$0 \$0	\$13,812 \$13,812

WBS				Name			Co:	st			
	evalua	ation" continued									
	ID	Resource Name	Uni	ts Wo	rk Del	ay Start	Finish	Cost	Baseline Cos	t Act. Cost	Rem. Cost
	12	Research Associate	e 150	960	hrs 0 da	ys Wed 6/12	2/02 Thu 10/3	/02 \$	O \$() \$0	\$0
	15	Scientist	50	% 320 l	hrs 0 da	ys Wed 6/12	2/02 Thu 10/3	/02 \$	0 \$6) \$0	\$0
	Note	es									
1.1. <i>′</i> 1.1.1.	Labor: 1) Pos 2) elec 3) Scie 1.1.9 Note Sched This is This is	the evaluation of the chip of the chip of the thick that the chip of the thick that the chip of the ch	e chip wit eded for s he effort	h the real DA upport with e	AQ, modify p lectrical boa 1st Ch	rograms etc. rd stuffing/testing. ip ready for hy	· brids	\$0	real sensor using both	a laser and a ra	diactive source.
1.1.1.	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	2	FNALR&D	0%	0 hrs	0 days	Thu 10/3/02	Thu 10/3/02	\$54,036	\$0	\$0	\$54,036
	3	FNALCont	0%	0 hrs	0 days	Thu 10/3/02	Thu 10/3/02	\$54,036	\$0	\$0	\$54,036
	7	Elect. Engineer	100%	160 hrs	0 days	Fri 10/4/02	Thu 10/31/02	\$8,152	\$0	\$0	\$8,152
	Labor: moslty	arts after chip evaluation c	·								
1.1.1.	1.11 <u>Not</u>			2nd	Chip: sub	mission (eng.	Run)	\$0			

General:

This is the 2nd engineering run submission with only svx4 devices. If changes are minor wrt 1st chip, all production wafers might be ordered at this time. For the purpose of this schedule we will order here 5 wafers worth of svx4 chips for CDF

WBS				Nam	ne		Co	ost			
1.1.1.1					2nd	d Chip: manufac	turing \$1	125,000			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
•	2	FNALR&D	0%	0 hrs	0 days	Thu 10/31/02	Thu 10/31/02	\$100,000	\$0	\$0	\$100,000
	3	FNALCont	0%	0 hrs	0 days	Thu 10/31/02	Thu 10/31/02	\$25,000	\$0	\$0	\$25,000
	Not	A S									

Cost:

The minimum order cost is 200K\$ which yields 10 wafers worth of chips.

100K\$ is the CDF part. We also may want to order extra wafers to get us through the rpeproduction phase. The extra cost is 25K\$ (10 wafers) which we have as contingency.

1.1.1.1.13 2nd Chip: postprocessing \$11,250

ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	FNALR&D	0%	0 hrs	0 days	Thu 1/9/03	Thu 1/9/03	\$7,500	\$0	\$0	\$7,500
3	FNALCont	0%	0 hrs	0 days	Thu 1/9/03	Thu 1/9/03	\$3,750	\$0	\$0	\$3,750

Notes

Schedule:

2 weeks for backgrounding, backplating and dicing

Cost

Total is 15K\$ (Engineering Estimate). CDF part is 7.5K\$

1.1.1.1.14 2nd Chip: engineering evaluation at FNAL \$4,076

ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
7	Elect. Engineer	50%	80 hrs	0 days	Fri 1/24/03	Thu 2/20/03	\$4,076	\$0	\$0	\$4,076

Notes

Most of the "low level" testing will be performed at LBL.

FNAL labor is mostly in testing the chip with the final DAQ chain at SiDet and Feynman.

1.1.1.1.15 2nd Chip: engineering evaluation at LBL \$12,000

ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	FNALR&D	0%	0 hrs	0 days	Thu 1/23/03	Thu 1/23/03	\$6,000	\$0	\$0	\$6,000
3	FNALCont	0%	0 hrs	0 days	Thu 1/23/03	Thu 1/23/03	\$6,000	\$0	\$0	\$6,000

Notes

Labor:

This is labor cost at LBL as from Henrik Van Der Lippe

project file svx4_0202.mpp of March 20 2002.

Tests performed at LBL include radiation damage assesment.

WBS				Name Co					ost					
1.1.1.	1.16			Set	up for pro	duction chip te	sting	\$8,958						
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost			
	1	FNALEQ	0%	0 hrs	0 days	Thu 2/20/03	Thu 2/20/03	\$3,750	\$0	\$0	\$3,750			
	3	FNALCont	0%	0 hrs	0 days	Thu 2/20/03	Thu 2/20/03	\$1,250	\$0	\$0	\$1,250			
	7	Elect. Engineer	25%	40 hrs	0 days	Fri 2/21/03	Thu 3/20/03	\$2,038	\$0	\$0	\$2,038			
	9	Elect. Technician	50%	80 hrs	0 days	Fri 2/21/03	Thu 3/20/03	\$1,920	\$0	\$0	\$1,920			
	15	Scientist	50%	80 hrs	0 days	Fri 2/21/03	Thu 3/20/03	\$0	\$0	\$0	\$0			

Notes

Schedule:

This is time for getting programs setup and procedures worked

out for testing chips on wafers.

Labor

Same crew as for the final production testing.

We assume that 1 scientist, 1 technician and 1 research associate will work full time on this task which is both for CDF and D0.

Below is the CDF share:

- 1. Scientist (50%)
- 2. Elect. Technician (50%)
- 3. postdoc (25%) support to CDF
- 4. Research Associate (50%)
- 5. Elect. Engineer (5%) chip designer expert

Cost

Cost is for probe cards, equipment and material. Total (engineering estimate) is \$7,500 plus \$2,500 for contingency.

CDF share is 50%:

\$3,750 EQ

\$1,250 CONT.

1.1.1.1	.17				2nd C	chip: evaluation	on \$1				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
•	9	Elect. Technician	20%	64 hrs	0 days	Fri 1/24/03	Thu 3/20/03	\$1,536	\$0	\$0	\$1,536
	12	Research Associate	150%	480 hrs	0 days	Fri 1/24/03	Thu 3/20/03	\$0	\$0	\$0	\$0
	15	Scientist	50%	160 hrs	0 days	Fri 1/24/03	Thu 3/20/03	\$0	\$0	\$0	\$0

Notes

General

This is the evaluation of the chip with CDF Data Aquisition System. Also we will evaluate the performance of the chip with real sensor using both a laser and a radiactive source.

- 1) Postdocs (150%) for testing the chip with the real DAQ, modify programs etc.
- 2) electrical technician (20%) needed for support with electrical board stuffing/testing.
- 3) Scientist (50%) to coordinate the effort

WBS Name Cost

1.1.1.1.18 2nd Chip ready for hybrids \$0

Notes

Schedule:

This is 1 month after receiving the Eng.run parts.

This is agressive and assumes the chip works without major problems.

1.1.1.1.19 Production Chip: layout \$69,660 ID Resource Name Units Work Delay Start Finish Cost **Baseline Cost** Act. Cost Rem. Cost 2 FNALR&D 0% 0 days \$32,792 \$0 \$32,792 0 hrs Thu 3/20/03 Thu 3/20/03 \$0 3 **FNALCont** 0% 0 hrs 0 days Thu 3/20/03 Thu 3/20/03 \$32,792 \$0 \$0 \$32,792 Fri 3/21/03 \$0 \$0 \$4.076 7 Elect. Engineer 50% 80 hrs 0 days Thu 4/17/03 \$4.076

Notes

Labor:

moslty LBL labor.

FNAL will provide help with an engineer 100% for 15 days during this period.

1.1.1.1.20 Production chip Submission \$0

Notes

Milestone not linked to anything, it could start as early as 40 days after receiving the engineering run chips

\$422,500 1.1.1.1.21 Production Chip: manufacturing **Baseline Cost** Act. Cost Rem. Cost ID Resource Name Units Work Delay Start Finish Cost **FNALEQ** 0% 0 days Thu 4/17/03 Thu 4/17/03 \$225,000 \$0 \$0 \$225,000 0 hrs 0% 0 hrs \$97,500 \$0 \$0 \$97,500 **FNALCont** 0 days Thu 4/17/03 Thu 4/17/03 3 Thu 4/17/03 \$0 \$0 \$100,000 ItalyEQ 0% 0 hrs 0 davs Thu 4/17/03 \$100,000

Notes

Cost:

Based on MOSIS (TSMC) price.

We need about 5000 chips in the detector + 2,000 spares

We order 14,000 chips to include yield. This is a conservative yield of 50%.

Masks cost is 150K\$ (to be split with D0) and 50K\$/lot (1lot = 10 wafers). Need to order 5 lots.

Total = 75K\$ + 250 K\$ = 325K\$

WBS N					Name Cost								
1.1.1.1				Р	roduction	Chip: postpro	ocessing	\$20,00					
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost		
·-	2	FNALR&D	0%	0 hrs	0 days	Fri 6/13/03	Fri 6/13/03	\$10,000	\$0	\$0	\$10,000		
	3	FNALCont	0%	0 hrs	0 days	Fri 6/13/03	Fri 6/13/03	\$10,000	\$0	\$0	\$10,000		

Schedule:

2 weeks for backgrounding, backplating and dicing.

Total cost is \$200 per wafer (Engineering Estimate). For 50 wafers = 10K\$

1.1.1.1	.23	I	Producti	on Chip:	enginee	ring evaluatio	n at LBL	\$9,0	00		
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
_	2	FNALR&D	0%	0 hrs	0 days	Fri 6/27/03	Fri 6/27/03	\$4,500	\$0	\$0	\$4,500
	3	FNALCont	0%	0 hrs	0 days	Fri 6/27/03	Fri 6/27/03	\$4,500	\$0	\$0	\$4,500

Notes

This is labor cost at LBL as from Henrik Van Der Lippe

project file svx4_0202.mpp of March 20 2002.

Tests performed at LBL include radiation damage assesment.

1.1.1.1	.24				C	DF chips: Te	st \$13				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
-	7	Elect. Engineer	10%	78.4 hrs	0 days	Tue 7/8/03	Fri 11/21/03	\$3,995	\$0	\$0	\$3,995
	9	Elect. Technician	50%	392 hrs	0 days	Tue 7/8/03	Fri 11/21/03	\$9,408	\$0	\$0	\$9,408
	12	Research Associate	75%	588 hrs	0 days	Tue 7/8/03	Fri 11/21/03	\$0	\$0	\$0	\$0
	15	Scientist	50%	392 hrs	0 days	Tue 7/8/03	Fri 11/21/03	\$0	\$0	\$0	\$0

Notes

Schedule:

We are assuming 44 wafers, 320 chips/wafer, and testing rate of 0.5 wafer/day (includes classifying and sorting chips). It will take 88 days.

1 scientist, 1 technician and 1 research associate will workfull time on this which is both for CDF and D0.

Below is the CDF share:

- 1. Scientist (50%)
- 2. Elect. Technician (50%)
- 3. Research Associate (25%) support to CDF
- 4. Research Associate (50%)
- 5. Elect. Engineer (10%) chip designer expert

² weeks days added for dicing at the end.

¹ week added for setup time at the beginning.

WBS	Name	Cost
1.1.1.25	CDF chips: 1/2 chips tested	\$0
1.1.1.26	Production Chips ready for hybrids	\$0
Notes		
Schedule:	testing to take into account the testing, dicing and lo	logging necessary
1.1.1.27	Chip testing Complete	\$0
1.1.1.2	Hybrids	\$2,038,538
Notes		
The Hybrid is a BeO substrate (2cmx3.9cm) Included in the bydrids are:		
1. 4 SVX4 chips.		
miscellanea components (capacitors,resis pitch adapters	tors, thermistor).	
4. testing boards		
Runs (4 chips hybrids): 1. Prototype#1 (milestone #1 "electrical stave	*******	
2. Protoype#2-Contingency (milestone #2 "co	ontingency electrical stave test")	
Preproduction (milestone #3 "preproduction Production (milestone #4 "Production election)	n electrical stave test") trical stave test")	
Need 1,080 4-chips hybrids and 72 2-chips I	nybrid for the project	
1.1.1.2.1	Outer layers	\$1,752,946
Notes		
Runs (4 chips hybrids):	al atoma topally Donate #4 alain	
Prototype (milestone #1 "prototype electric Contingency (milestone #2 "contingency e	lectrical stave test"), Proto#2 chip	
3. Preproduction (milestone #3 "preproduction		
4. Production (milestone #4 "Production elec	trical stave test), Production chips	
Need 1,080 hybrids		
1.1.1.2.1.1	Hybrid #1: Layout	\$0
Notes	and order or a sect	
Cost of the layout (CAD etc.) is in the manuf	acturing cost.	
1.1.1.2.1.2	Hybrid#1: Submission	\$0

WBS			Nam	ne)	Cost			
1.1.1.2.1.3			. tan		orid #1: manufa		\$114,391			
IC	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2		0%	0 hrs	0 days	Mon 4/15/02	Mon 4/15/02	\$87,993	\$0	\$0	\$87,993
3	FNALCont	0%	0 hrs	0 days	Mon 4/15/02	Mon 4/15/02	\$26,398	\$0	\$0	\$26,398
<u>N</u>	otes		_							
We build Cos Bas V6.0 Part 1. H 2. bi 3. pi 4. hi 5. B Tota 1.1.1.2.1.4 No Sch	ed on "FY2002 developmed Mar-24-2002 (C.Haber, 15) mar-24-2002 (C.Haber, 15) martis: lybrids, 40 us cables, 15 litch adapter, 40 lybrid test card, 40 leO blanks for mini port call cost (including Labor, on 14) otes ledule:	ent cost for LBL)	CDF Run2	b Hybrids &) = \$87,993 Hyt	stave bus" orid #1 ready fo	or chips	\$0			
1.1.1.2.1.5	s is 10 days after receiving	hybrids to	allow for so	ome minimal	Hybrid #1 av	vailable	\$0			
	otes				riybiid ii i av	anabio	ΨΟ			
Avai Sch We	ilable means chips are alreedule: are assuming this will be as part of our 1st project in	3 weeks aft	er substrat	e are availab	le (test and load the	e substrate) and 2 w	reeks after chip	os are available (for m	ounting, bondin	g and testing).
1.1.1.2.1.6					Hybrid #1: Eva	lluation	\$0			
	otes		_							
Labo Tes:	or: t are done at LBL (no FNA	L labor)								
1.1.1.2.1.7				Se	etup Hybrid test	: stand	\$70,491			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1 3	FNALEQ FNALCont	0% 0%	0 hrs 0 hrs	0 days 0 days	Thu 7/11/02 Thu 7/11/02	Thu 7/11/02 Thu 7/11/02	\$46,994 \$23,497	\$0 \$0	\$0 \$0	\$46,994 \$23,497

WBS				Nam	ıe		C	ost				
	d tes	st stand " continued	4									
	Note		4									
-	enera			=								
It		the equipment at LBL ar stly an update of the exi			ng and burn	-in of the hybrids.						
N		to be completed and in p	place by the	e time prep	production h	lybrids are ready to be	e tested					
		grade costs are handles										
	-	is cost are based on D. \$46,994 and includes la				2002.						
		ly that some of this mon				ds.						
1.1.1.2.1	.8					Hybrid #2: La	ayout	\$ 0				
	Note	es				,	,	•				
	enera											
		a contingency run of hyt	orids. We	would wave	e this option	if the first round of cl	hips+hybrids is work	ing reasonably v	vell. Cost goes all in the	ne contingency.		
	chedu vbrid :	ile: #2 is meant to be used v	with 2nd rc	und of chi	ns							
	abor:	72 is mount to be used t	VIIII ZIIG IO	and or only	50.							
С	ost of	the layout (CAD etc.) is	in the mar	nufacturing	cost.							
1.1.1.2.1	.9				1	Hybrid #2: Subm	ission	\$0				
1.1.1.2.1.						orid #2: manufac		114,391				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	_
	3	FNALCont	0%	0 hrs	0 days	Thu 10/31/02	Thu 10/31/02	\$114,391	\$0	\$0	\$114,391	
	Note	s										
	enera											
С	ost:	a contingency run in cas brid#1: manufacturing"	e the first	hybrid run	has major f	laws, or modifications	s occured to the chip	from first to sec	cond engineering run	which requires t	lybrid modification	iS.
1.1.1.2.1.					Hyl	brid #2 ready for	chips	\$ 0				
	Note	s		_,								
	chedu his is	ile: 10 days after receiving h	nybrids to a	allow for so	ome minimal	l test.						

WBS				Nan	ne			Cost			
1.1.1.2	.1.12					Hybrid #2 av	/ailable	\$0			
	Not	es									
		ole means chips are alrea	ady mounte	ed bonded	and tested v	with the hybrids.					
	Sched We are	ule: e assuming this will be 3	weeks afte	er substrat	te are availab	ole (test and load th	e substrate) and 2 v	weeks after chip	s are available (for mo	ounting, bonding	and testing).
						(()	,g,	9,-
1.1.1.2	.1.13					Hybrid #2: Eva	aluation	\$0			
	Not	es									
	Labor:			<u>-</u> '							
	Test a	re done at LBL (no FNAL	labor)								
1.1.1.2	.1.14				Prepro	duction hybrid:	Layout	\$0			
	Not	es									
	Labor:			-							
	Cost o	f the layout (CAD etc.) is	in the ma	nufacturin	g cost.						
1.1.1.2	.1.15			Pre	eproduction	on Hybrid: Sub	mission	\$0			
1.1.1.2	.1.16			Prepr	roduction	hybrid: manufa	acturina	\$197,343			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Thu 4/17/03	Thu 4/17/03	\$151,802	\$0	\$0	\$151,802
	3	FNALCont	0%	0 hrs	0 days	Thu 4/17/03	Thu 4/17/03	\$45,541	\$0	\$0	\$45,541
	Not	00			•						
	Sched			-							
		as to cover stave product	tion ramp ι	ıp time.							
		duction parts should be									
	vve as Cost:	sume to sustain a rate of	2 staves/	week aurin	ng preproduc	tion (1 stave/day di	uring production).				
		on "cost for phase 2: pre		n phase"							
		Mar-24-2002 (C.Haber, Ll cost is \$151,802. Include		or overbo	ad tost card	s and tosts					
	i otal C	.031 13 # 13 1,002. HICIUU C	s yi c iu, iau	oi, overile	au, icsi calu	s and tests					
1.1.1.2	.1.17			Prepr	oduction	Hybrid ready fo	or chips	\$0			
	Not	es									

This is 40 (manufacturing)+10 (testing and loading) days after submission as a possible first batch of the pre-production.

WBS			Name	Э		Co	ost			
1.1.1.2.1.18			P	Preprodu	ction Hybrid Ava	ilable	\$ 0			
_No	tes									
	nth after the production ch			mounted o	n hybrids					
	eks for mounting and testir	ng the hybrid								
1.1.1.2.1.19			F	Preprodu	ction Hybrid con	nplete	\$0			
This	tes assumes 10 hybrids delive aybrids = 90 days of loadin			eek,						
	iybnas = 90 days or ioadin	g and testin	ıg							
1.1.1.2.1.20 1.1.1.2.1.21			Pre		on Hybrid: Evaluduction Hybrid: I		\$ 0 \$ 0			
	tes				,	.,	* -			
Gene	ral:									
This Labo	task is contingency.									
	of the layout (CAD etc.) is	in the manu	ufacturing	cost.						
1.1.1.2.1.22				Produc	tion Hybrid Go-a	ahead	\$ 0			
	tes			1 Todac	don'nybrid Go-a	arieau	ΨΟ			
Sche										
	need enough time to evalu					a manada a Cara				
AISO	we need some time to test	tne preproc	duction DA	.Q cnain be	rore committing to the	e production.				
1.1.1.2.1.23			Pro	duction I	Hybrid: manufac	turing \$1,2	256,330			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1	FNALEQ			0 days	Tue 10/14/03	Tue 10/14/03	\$966,408	\$0	\$0	\$966,408
3	FNALCont	0%	0 hrs	0 days	Tue 10/14/03	Tue 10/14/03	\$289,922	\$0	\$0	\$289,922
	tes									
Gene	ral: titiy needed is 1,080 + spa	arec – 1200	hybride							
Cost			-							
	d on "Production cost for (Hybrids &	stave bus'						

V3.0 Mar-24-2002 (C.Haber, LBL)

Total cost is \$966,408. Includes yield, labor, overhead, test cards and tests

WBS Name Cost
1.1.1.2.1.24 Production Hybrids Available \$0
Notes
This assumes 40 days for completion of the first batch of substrates plus a month (20days) for loading and testing and setup time.
1.1.1.2.1.25 Production Hybrid: testing \$0
Notes
Schedule:
We need to sustain a rate of 40/week (=8/day) delivered to Fermilab. We assume production is 1200 hybrids = 150 days of loading and testing. Labor:
This is handled at LBL and UC Davis with contributions from other institutions partecipating in the project. No labor cost for FNAL.
1.1.1.2.1.26 Hybrid Production Complete \$0
1.1.1.2.2 Layer 0 \$285,592
Notes
Runs: 1. Prototype 2. Production
Need 72 2-chips hybrids.
1.1.1.2.2.1 Prototype#1 L0 hybrid: Layout \$0
Notes
Schedule:
Layout can start as soon as the first outer layer hybrid has been submitted for fabrication.
Labor: Costed in the manufacturing.
1.1.1.2.2.2 Prototype#1 L0 hybrid: Submission \$0
1.1.1.2.2.2 Prototype#1 L0 hybrid: Submission \$0 1.1.1.2.2.3 Prototype#1 L0 hybrid: manufacturing \$142,796
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
2 FNALR&D 0% 0 hrs 0 days Thu 2/20/03 Thu 2/20/03 \$95,197 \$0 \$0 \$95,197
3 FNALCont 0% 0 hrs 0 days Thu 2/20/03 Thu 2/20/03 \$47,599 \$0 \$0 \$47,599
Notes

General:

72 needed for entire production. We assume that prototype#1 coincides with pre-production. The risk should be highly mitigated by the experience gained with the outer hybrid.

Schedule:

For the L0 project we assume that the prototype#1 L0 hybrid are pre-production type.

WBS			Nan	ne		Co	ost				
"Prototype#1	L0 hybrid: manufactu	ring" cor	ntinued								
,	Notes	Ū									
T rc T C	he preproduction of L0 hybric ound of chips (Contingency cl he above might change if the ost: stimated from LBL Hybrid-Sta	nips) have 1st round	been fully of svx4 chi	evaluated.							: 2nd
1.1.1.2.2	2.4		F	Prototype#	‡1 L0 hybrid Ava	ailable	\$0				
	Notes		_								
T T	chedule: his is 20 days after substrate his order could cover the full hese hybrids are meant to be	production		Ü	resting).						
1.1.1.2.2	2.5 Pro	ototype#	1 L0 hyb	orid: evalu	ation and final o	design	\$0				
	Notes		-								
_	abor: BL labor only (no FNAL effort)									
1.1.1.2.2	2.6		Pr	oduction	L0 Hybrid: final	layout	\$0				
L	Notes abor: abor cost included in the mar	nufacturino	-								
1.1.1.2.2 1.1.1.2.2					L0 Hybrid Subm hybrid: manufac		\$0 142,796				
	ID Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	1 FNALEQ 3 FNALCont	0% 0%	0 hrs 0 hrs	0 days 0 days	Tue 10/21/03 Tue 10/21/03	Tue 10/21/03 Tue 10/21/03	\$95,197 \$47,599	\$0 \$0	\$0 \$0	\$95,197 \$47,599	
	Notes										
C B V	ost: ased on "production cost for 3.0 Mar-24-2002 (C.Haber, L otal cost is \$95,197. Includes	BL)	•								
1.1.1.2.2	2.9			Production	on L0 hybrid ava	ailable	\$0				
1.1.1.2.2.	10			Production	on L0 hybrid con	nplete	\$0				

WBS			Nam	ne		(Cost			
1.1.1.3					Bus	Cables	\$61,502			
Oute	otes r layer Bus cable is a Kap up from the sensors and t				ower traces to elect	rically connect the m	•	hybrids. It also provid	des a ground sh	ield plate to minimise noise
2. Pr	s: ototype (milestone #1 "ele eproduction (milestone #3 oduction (milestone #4 "F	"Preproduc	ction elect		est")					
Need	360 bus cables for the pr	oject.								
Labo All I	r: 3L labor. No FNAL efforts	for the Rus	: Cable							
1.1.1.3.1				able: spe	cs, design and	Layout	\$0			
	otes									
Subr Labo	edule: nission date coincides witl r: bor is in LBL by physicists			e for the hyb	rid. Hybrids take lon	ger to fabricate, load	d and test.			
1.1.1.3.2		(otype#1 F	Bus Cable Subn	niccion	\$0			
1.1.1.3.2					Cable: Manufa		\$3,578			
ID		Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	FNALR&D FNALCont	0% 0%	0 hrs 0 hrs	0 days 0 days	Mon 4/15/02 Mon 4/15/02	Mon 4/15/02 Mon 4/15/02	\$2,385 \$1,193	\$0 \$0	\$0 \$0	\$2,385 \$1,193
No	otes									
in or Cost Base V6.0	vant 2 flavours of these ca der to test the noise pick-u	p on the sil nt cost for (BL)	icon. CDF Run2	b Hybrids &	,					
1.1.1.3.4 1.1.1.3.5					1 Bus Cable av Bus Cable: Eva		\$0 \$0			
	otes									
Labo	l'. haria dana at I PI (na EN	Al Johan								

All labor is done at LBL (no FNAL labor).

WBS				Nam	ne		1	Cost				
1.1.	1.3.6			P	reproduc	tion Bus Cable:	layout	\$0				
	Not	es			·		-					
	Labor:	ule: ssion date coincides with or is done at LBL (no FN		- nission date	e for the prep	production hybrids. I	Hybrids take longer	to fabricate, l	oad and test.			
	1.3.7 1.3.8		Dr			Bus Cable Subn Cable: manufa		\$0 \$9,699				
1.1.	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	1 3	FNALEQ FNALCont	0% 0%	0 hrs 0 hrs	0 days 0 days	Thu 4/17/03 Thu 4/17/03	Thu 4/17/03 Thu 4/17/03	\$6,466 \$3,233	\$0 \$0	\$0 \$0	\$6,466 \$3,233	
1.1.	V6.0 N	on "FY2002 developmer Mar-24-2002 (C.Haber, L 5 for 60 parts. Includes o	BL)			stave bus" Bus Cables av	ailable	\$0				
1.1.1	.3.10 Not	ac	Produc	ction Bu	s Cable: f	inal design and	layout	\$0				
	Sched Submi This ta Labor:				e for the pre	oroduction hybrid. H	ybrids take longer to	o fabricate, lo	ad and test.			
1.1.1	.3.11			Pro	oduction E	Bus Cable Sum	bission	\$0				
1.1.1	.3.12			Produ	ction Bus	Cable: manufa	cturing	\$48,225				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	t Act. Cost	Rem. Cost	
	1	FNALEQ	0%	0 hrs	0 days	Mon 7/28/03	Mon 7/28/03	\$32,150	\$0	50 \$0	\$32,150	
	3	FNALCont	0%	0 hrs	0 days	Mon 7/28/03	Mon 7/28/03	\$16,075	\$0	\$0	\$16,075	
	Not Cost:	es "EV2002 developmen		- -	0 ماداداداداداداداداداداداداداداداداداداد	ataua kuu "						

Based on "FY2002 development cost for CDF Run2b Hybrids & stave bus" V6.0 Mar-24-2002 (C.Haber, LBL) \$32,150 for 400 parts. Includes overhead.

WBS	Name	Cost	t	
1.1.1.3.13	Production Bus cab	les available	\$0	
1.1.1.3.14	Production Bus Cab	les complete	\$0	
1.1.1.4	M ¹	ini Port Card \$62	² 7.838	

Notes

The MPC is a BeO hybrid (2"x1.55"). Included in the miniportcards are:

- 1. components (including tranciever chips), connectors etc.
- 2. short kapton cables (2 cables, one for power and one for data)
- 3. cable wing (one kapton cable that connects the top MPC to the bottom stave bus cable)

Runs:

- 1. Prototype (milestone #1 "electrical stave test")
- 2. Contingency (milestone #2 "contingency electrical stave test")
 3. Preproduction (milestone #3 "preproduction electrical stave test")
- 4. Production (milestone #4 "Production electrical stave test")

Need 180 Mini Port Cards for the project

1.1.1.	4.1		Proto	type#1 M	IPC: spe	cs, design an	d layout	\$47,49	6					
	ID	Resource Name	Units	Work	Dela	y Star	t Fir	ish (Cost	Baseline	Cost /	Act. Cost	Rem. Co	ost
-	7	Elect. Engineer	50%	480 hr	s 0 day	/s Wed 10/	10/01 Mon	4/8/02 \$2	24,456		\$0	\$0	\$24,4	56
	9	Elect. Technician	100%	960 hr	s 0 day	ys Wed 10/	10/01 Mon	4/8/02 \$2	23,040		\$0	\$0	\$23,0)40
	Note	es												
	Genera _avout	al: should finish together wi	th the Hvbr	id#1 desiar	١.									
1.1.1.	4 2				Prototype	e#1 MPC sub	mission	\$	Λ					
1.1.1.						MPC: manuf		Ψ \$59,17						
	ID	Resource Name	Units		Delay	Start	Finish	Cost		ne Cost	Act. Co	st Rem	. Cost	
_	2	FNALR&D	0%	0 hrs	0 days	Mon 4/8/02	Mon 4/8/02	\$45,522		\$0		\$0 \$4	15,522	
	3	FNALCont	0%	0 hrs	0 days	Mon 4/8/02	Mon 4/8/02	\$13,657		\$0	;	\$0 \$1	3,657	
	Note	es												

General:

We need 10 mini-PC to sustain the stave prototype effort + test stand needs.

- 1/31/2002 estimated cost is (quotation from CPT n. 1-1201-112)
- newer quotation (02/01/2002):
- 1. 25 (minimum order) MPC @ 1,168.90 each
- 2. NRE 4,500.00
- 3. PigTail (2) 370.00 (per MPC) 185 each
- 4. cable wing 210.00 (per MPC)

••	PC: manufacturing"	continued	Name			Co	ost				
Not 3. mis	Ces cellenea components	600.00 (per	MPC)								
	- -	5,522.50									
Wen	riced the "loading" of 10 N	•	ntvnes								
1.1.1.4.4				rototype#	1 MPC Ava	ilahla	\$0				
Not	res		'	iototype#	- I WII O Ava	liable	ΨΟ				
This h	nas 10 days for assembly										
for tes	sting. We impose MPC a	vailability 3 w	eeks before H	ybrid #1 is r	eady for chips.	This is our continge	ncy.				
1.1.1.4.5	5	-	•		ly and evalu		\$11,756	. 5 !! .			
<u>ID</u> 7	Resource Name Elect. Engineer	Units 25%		Delay 0 days					Cost Act. 0 \$0	Sost Rem. Co: \$4,07	
9	Elect. Technician			,			. ,		\$0 \$0	\$0 \$4,07 \$0 \$7,68	
12	Research Associa						. ,	\$0	\$0		60
1.1.1.4.6			Prototype#	:2 MPC: d	design and I	ayout	\$7,916				
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
7	Elect. Engineer	50%		,	Fri 9/27/02	Thu 10/24/02	. ,	\$0	\$0	\$4,076	
9	Elect. Technician	100%	160 hrs	0 days	Fri 9/27/02	Thu 10/24/02	2 \$3,840	\$0	\$0	\$3,840	
<u>Not</u> Gene											
This is	s a contingency run of Mi	PCs. We wou	ld wave this o	otion if the fi	rst round of chi	ps+hybrids+MPC is	working reaso	nably well. Cost goes	all in the contir	gency.	
Sched Subm	dule: ission date is linked to the	e submission	of the 2nd hyb	orid prototyp	e.						
1.1.1.4.7			Prof	otype#2	MPC Submi	ecion	\$0				
1.1.1.4.8					C: manufact		40 \$59,179				
ID	Resource Name	Units V	Vork De	lay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
3	FNALCont	0% (0 hrs 0 d	ays Thu	u 10/24/02	Thu 10/24/02	\$59,179	\$0	\$0	\$59,179	
Not	tes										
Cost:	as for "Prototype#1 MPC	: manufacturi	ina".								
	Contingency.		···• ·								

WBS			Name				Cost				
1.1.1.4.9			Hame		e#2 MPC Av		\$0				
Not	es			1 Tototyp	C#2 IVII O AV	allable	ΨΟ				
This h	as 10 days for assembly					This is some south					
	ting. We impose MPC av										
1.1.1.4.10			• •		mbly and eva		\$11,756				
ID	Resource Name	Uni			lay Sta						_
7 9	Elect. Engineer Elect. Technician	25 100			ays Fri 2/1 ays Fri 2/1				•	\$4,076 \$0 \$7,680	
12	Research Associa				ays Fri 2/1					50 \$7,000 50 \$0	
1.1.1.4.11											
1.1.1.4.11 ID	Resource Name	Units	reprodu Work		C: design and Start	Finish	\$15,832 Cost	Baseline Cost	Act. Cost	Rem. Cost	
7	Elect. Engineer	50%	160 hrs						\$0	\$8,152	
9	Elect. Technician		320 hr						\$0 \$0	\$7,680	
Not	es			-							
Gener											
	to the Preproduction hyb	oria iayout.									
1.1.1.4.12			Pre	eproduction	on MPC Subr	nission	\$0				
1.1.1.4.13			Prepro	oduction N	/IPC: manufa	cturing	\$82,826				
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
1	FNALEQ	0%		,	Thu 4/10/03	Thu 4/10/03	\$63,712	\$0	\$0	\$63,712	
3	FNALCont	0%	0 hrs	0 days	Thu 4/10/03	Thu 4/10/03	\$19,114	\$0	\$0	\$19,114	
Not											
	der enough to sustain sta ves = 30 MPC including:										
Cost:	•	•	s and yicid.								
	C (same price as the pro shed substrate @ 1	ototypes) I,168.90 (pe	r MDC)								
2. NRI		4,500.00	,								
3. Pig				es, 2 per MPC							
	cellenea components	600.00 (p		, 1 per MPC	needed)						
		3,712.00									

WBS Name Cost													
1.1.1.4.14 Preproduction MPC assembly and evaluation \$15,596													
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Co	st												
7 Elect. Engineer 25% 80 hrs 0 days Mon 6/23/03 Mon 8/18/03 \$4,076 \$0 \$0 \$4,076													
9 Elect. Technician 150% 480 hrs 0 days Mon 6/23/03 Mon 8/18/03 \$11,520 \$0 \$0 \$11,52													
	0												
Notes													
This assumes 40 days for producing first substrates plus 20 days for loading and testing. This should also coincide with preproduction hybrids available.													
1.1.1.4.15 Preproduction MPC Available \$0													
1.1.1.4.16 Production MPC: design and layout \$6,678													
ID Resource Name Units Work Delay Start Finish													
7 Elect. Engineer 25% 40 hrs 0 days Wed 9/10/03 Tue 10/7/03													
11 Mech. Technician-SiDet 100% 160 hrs 0 days Wed 9/10/03 Tue 10/7/03													
ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost													
7 Elect. Engineer 25% \$2,038 \$0 \$0 \$2,038													
11 Mech. Technician-SiDet 100% \$4,640 \$0 \$0 \$4,640													
Notes													
Schedule: Linked to the production hybrid layout. This task is contingency.													
1.1.1.4.17 Production MPC go ahead \$0													
·													
1.1.1.4.18 Production MPC: manufacturing \$270,634													
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost													
1 FNALEQ 0% 0 hrs 0 days Tue 10/7/03 Tue 10/7/03 \$208,180 \$0 \$0 \$208,180													
3 FNALCont 0% 0 hrs 0 days Tue 10/7/03 Tue 10/7/03 \$62,454 \$0 \$0 \$62,454													
Notes Cost:													

We need 180 + spares = 200 MPC: Production price is (quotation from CPT 1-1201-112) MPC @ 418.00 each NRE @ 4,500.00 pigtails are 77.90 per MPC wing is 22.50 per MPC components is 500 per MPC Total is 208,180 \$

WBS	Name	Cost	
	De la dia MDO	- 1 - 1 - 1	
1.1.1.4.19	Production MPC ava	allable \$0	
Notes			

40days for production of first substrates and 20 days for assembly and testing.

Production MPC: assembly and evaluation 1.1.1.4.20 \$38,990 ID Resource Name Units Work Delav Start Finish Cost Baseline Cost Act. Cost Rem. Cost Elect. Engineer 200 hrs 0 days Fri 1/16/04 \$10,190 \$0 \$0 \$10,190 25% Fri 6/4/04 150% 1,200 hrs 0 days Fri 1/16/04 Fri 6/4/04 9 Elect. Technician \$28,800 \$0 \$0 \$28,800 12 Research Associate 100% 800 hrs 0 days Fri 1/16/04 Fri 6/4/04 \$0 \$0 \$0 \$0

Notes

We need to sustain a rate of 1MPC/day or 5MPC/week.

It should be possible to load and test at least 2/day (10/week).

For production quantity of 200 MPC this is 100 days.

1	1.1.	.4.21				Pr	odu	ctio	n M	PC	con	nple	te			\$0							
	1.1	1.1.5						Jur	octio	n P	ort	Card	ds	\$3	31,6	552							

Notes

The JPC is an FR4 board (possibly 2 boards) for signal and power distribution.

1. components (capacitors, resistors, power filters, FPGA, connectors etc.)

- 1. Prototype#1 (milestone#1 "prototype electrical stave test")
- 2. Prototype#2 contingency
- 2. Preproduction (milestone#3 "preproduction electrical stave test")
 3. Production (milestone#4 "production electrical stave test")

Each port card can serve up to 5 mini-PC.

Total number of JPC for the project (inlcuding L0) is 56.

WBS	Name	Cost	
"Junction Port Cards" continu			
Notes			

Junction Port Cards

Layer	Φ-seg.	MPC (each side)	JPC (Total)
5	30	30	12
5	30	30	12
4	24	24	10
4	24	Z 4	10
3	18	18	8
3	18	10	8
2	12	12	6
2	12	12	U
1	6	6	4
1	6	U	4
0	12	0	16
	Tota	l JPC	56

1.1.1.5.	::::::::::::::::::::::::::::::::::::::				for milestone #1		76			
10	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
7	Zelect. Engineer	25%	80 hrs	0 days	Wed 5/29/02	Wed 7/24/02	\$4,076	\$0	\$0	\$4,076
1.	2 Research Associate	50%	160 hrs	0 days	Wed 5/29/02	Wed 7/24/02	\$0	\$0	\$0	\$0

Notes

General:

This card is already done. It was developed for BTeV and can be used for the milestone #1.

Optionally we would like to have also the prototype #1 JPC ready for milestone #1 but it is not mandatory.

This JPC has the same functionality of the final JPC.

Labor:

This is to program the card (firmware).

WBS			N	lame			Cos	st				
1.1.1.	5.2		Prototype	e#1 JPC:	specs, de	esign and layo	out \$	\$4,076				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	t Act.	Cost R	em. Cost
- -	7	Elect. Engineer	25%	80 hrs	0 days	Tue 4/9/02	Tue 6/4/02	\$4,076	\$0		\$0	\$4,076
	12	Research Associate	50%	160 hrs	0 days	Tue 4/9/02	Tue 6/4/02	\$0	\$0)	\$0	\$0
	Note	es										
	Schedu											
.	inked t	o the end of the mini-PC layo	out									
1.1.1. 1.1.1.						IPC Submissi : manufacturi		\$0 13,500				
	ID	Resource Name U	nits Wo	rk Dela	ıy S	tart Fi	nish Cos	st Basel	ine Cost Ac	t. Cost	Rem. C	ost
-	2	FNALR&D	0% 0 h			6/4/02 Tue	6/4/02 \$9,0	00	\$0	\$0	\$9,0	000
	3	FNALCont	0% 0 h	rs 0 day	ys Tue	6/4/02 Tue	6/4/02 \$4,50	00	\$0	\$0	\$4,5	500
	Note	es										
	Cost:											
	\$800 e	ed 5 for testing chips/hybrids ach for the FR4 manufacturin each for miscellanea compo 9 000	ng (Engineer	ing Estimate	e). mate)							
1.1.1.			Dro	totypo#1	IDC: loo	ding and testi	na	\$5,878				
1.1.1.	J.J	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline	Cost A	Act. Cost	Rem. Cost
-	7	Elect. Engineer	25%	40 hrs	0 days	Wed 7/3/02				\$0	\$0	\$2,038
	9	Elect. Technician	100%	160 hrs	0 days	Wed 7/3/02		. ,		\$0	\$0	\$3,840
	12	Research Associate	50%	80 hrs	0 days	Wed 7/3/02	Wed 7/31/0	02 \$	0	\$0	\$0	\$0
	Note	es										
	_abor:											
	oading	and testing done at FNAL										
1.1.1.	5.6			Pr	ototype#1	1 JPC Availal	ole	\$ 0				
-	Note											
	JPC ar	pose JPC availability 3 week e NOT formally part of our 1s	st project mil	estone (stav	e electrical t	est) since the sta	ve can be readout	without the JF	PC. However we s	still would li	ike to have t	ne first JPC available
1.1.1.		ime of the 1st milestone to be	adie to test			JPC: evaluati		23,512				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cos	t Baseline	Cost	Act. Cost	Rem. Cost
-	7	Elect. Engineer	25%	160 hrs	0 days	Thu 8/1/02	Mon 11/25/			\$0	\$0	
		<u> </u>			•			•				-

WBS		1	Name			Cos	t			
"Prototype#1JP0	C: evaluation" continue	d								
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Co	ost Act. Co	ost Rem. Cost
9	Elect. Technician	100%	640 hrs	0 days	Thu 8/1/02	2 Mon 11/25/0	2 \$15,36	60	\$0	\$0 \$15,360
12	Research Associate	50%	320 hrs	0 days	Thu 8/1/02	2 Mon 11/25/0)2 \$	60	\$0	\$0 \$0
1.1.1.5.8		P	rototype#2	2 JPC: de	esign and lay	out \$	2,038			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	t Act. Cos	t Rem. Cost
7	Elect. Engineer	25%	40 hrs	0 days	Fri 10/25/02	Mon 11/25/0	2 \$2,038	\$0) \$(\$2,038
12	Research Associate	50%	80 hrs (0 days	Fri 10/25/02	Mon 11/25/0	2 \$0	\$0) \$(0 \$0
Not Gener This is 1.1.1.5.9		We would v			st round of chips		is working re	asonably well. Cost o	goes all in the c	ontingency.
1.1.1.5.10			Prototyp	e#2 JPC	: manufactu	ring \$1	3,500			
ID	Resource Name Ur	its Wo	rk Dela	У	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
3	FNALCont (0% 0 h	rs 0 day	/s Mon	11/25/02	Mon 11/25/02	\$13,500	\$0	\$0	\$13,500
_Not	es									
\$800 (\$1,000 Total \$	eed 5 for testing chips/hybrids/ each for the FR4 manufacturin 0 each for miscellanea compor 69,000. et is contingency.	g (Enginee	ring Estimate							
1.1.1.5.11		Pro	ototype#2	JPC: loa	ding and tes	ting \$	5,878			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
7	Elect. Engineer	25%	40 hrs	0 days	Fri 1/3/03	Thu 1/30/03	\$2,038	\$0	\$0	\$2,038
9	Elect. Technician	100%	160 hrs	0 days	Fri 1/3/03	Thu 1/30/03	\$3,840	\$0	\$0	\$3,840
12	Research Associate	50%	80 hrs	0 days	Fri 1/3/03	Thu 1/30/03	\$0	\$0	\$0	\$0
Not	es									

Labor:

Loading and testing done at FNAL

WBS			Name			Cost				
1.1.1.5.12				ototype#2	2 JPC Availab		\$0			
Not	es			ototypo#2	- Or Or Wallas		Ψ			
We in JPC a	npose JPC availability 3 we re NOT formally part of our	eks before H 1st project n	ybrid #1 is rea nilestone (stav	ady for chips re electrical to	. This is our continest) since the stav	gency. e can be readout v	vithout the JPC	C. However we still wo	ould like to have	the first JPC available
at the	time of the 1st milestone to	be able to te	st the concept	t (measure p	ower dissipation e	tc.)				
1.1.1.5.13			Prot	totype#2:	JPC evaluation	n \$20	3,512			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost		Rem. Cost
7	Elect. Engineer	25%	160 hrs	0 days	Fri 1/31/03	Thu 5/22/03	\$8,152	\$0	\$0	\$8,152
9 12	Elect. Technician Research Associate	100% 50%	640 hrs 320 hrs	0 days 0 days	Fri 1/31/03 Fri 1/31/03	Thu 5/22/03 Thu 5/22/03	\$15,360 \$0	\$0 \$0	\$0 \$0	\$15,360 \$0
	Research Associati						-	Φυ	φυ	Φ∪
1.1.1.5.14		Pr	-		sign and layo		6,114			
ID	Resource Name	Units	Work	Delay	Start	Finish			Act. Cost	Rem. Cost
7 12	Elect. Engineer Research Associate	50% 50%	120 hrs 120 hrs	0 days 0 days	Fri 4/11/03 Fri 4/11/03	Thu 5/22/03 Thu 5/22/03	\$6,114 \$0	\$0 \$0	\$0 \$0	\$6,114 \$0
		30%	120 1115	0 days	FII 4/ I I/U3	111u 5/22/03	ΦΟ	ΦΟ	φυ	ΦО
Not Sched										
	to the MPC preproduction.									
1.1.1.5.15			Prepro	duction J	PC Submission	ın	\$0			
1.1.1.5.16					: manufacturin		3,750			
1.1.1.5.10 ID	Resource Name	Jnits W	ork Dela			•	•	seline Cost Act	t. Cost Re	m. Cost
1	FNALEQ		hrs 0 day	,			2,500	\$0		\$22,500
3	FNALCont		hrs 0 day	,			1,250	\$0		\$11,250
Not	es									
Gener	al:									
We ne Cost:	ed 10 (preproduction)+5 fo	r testing setu	ıps including s	spares.						
\$600 €	each for FR4 boards									
	each for components and lo 322,500	ading and te	sting (Enginee	ering Estimat	ie).					
1.1.1.5.17			Pr	reproducti	on JPC: testin	ıg \$1 [.]	1,756			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	t Act. Cos	t Rem. Cost
7	Elect. Engineer	25%	80 hrs	0 days	Mon 6/23/03		. ,			
9	Elect. Technician	100%	320 hrs	0 days	Mon 6/23/03		. ,	•		. ,
12	Research Associate	e 50%	160 hrs	0 days	Mon 6/23/03	Mon 8/18/0)3 \$0	\$0) \$(\$0

WBS				Name	Э)	Cost						
	n .IF	PC: testing" continu	ıed													
•	Note	ŭ	.00													
L		and basic testing done of														
1.1.1.5.	18				Prep	roductio	n JPC ava	ailable			\$0					
_	Note	s														
L	ag tim	e of 20days for loading a	nd testing.													
1.1.1.5.	19			I	Prepro	duction	JPC: eval	uation		\$17,6	34					
_	ID	Resource Name	Unit	s W	ork	Delay	Star		Fini	ish	Cost	Baselin	e Cost	Act. Co	st F	Rem. Cost
_	7	Elect. Engineer	25) hrs	0 days	Tue 7/2		Tue 10		\$6,114		\$0		\$0	\$6,114
	9	Elect. Technician	100) hrs	0 days	Tue 7/2		Tue 10		\$11,520		\$0		\$0	\$11,520
	12	Research Associa	te 50°	% 240) hrs	0 days	Tue 7/2	2/03	Tue 10	/14/03	\$0		\$0	;	\$ 0	\$0
1.1.1.5.	20			Prod	uction	JPC: de	esign and	layout		\$2,0	38					
_	ID	Resource Name	Unit		rk [Delay	Start		Finis			Baseline C	ost A	ct. Cost	Rem	n. Cost
	7	Elect. Engineer	25%			,	Wed 10/8		Tue 11/4		\$2,038		\$0	\$0	,	\$2,038
	12	Research Associa	te 50%	6 80 I	nrs C) days	Wed 10/8	3/03	Tue 11/4	4/03	\$0		\$0	\$0		\$0
_	Note	S														
Li		le: to the MPC production lag sk is contingency.	yout.													
1.1.1.5. 1.1.1.5.	21	n e comingorioy.		P			n JPC go : manufac			\$135,0	\$0 000					
	ID	Resource Name	Units	Work	Delay	/ 5	Start	Fir	nish	Cos	t Base	line Cost	Act. C	ost Re	m. Co	st
_	1	FNALEQ		0 hrs	0 day	s Tue	11/4/03	Tue 1	1/4/03	\$90,0	00	\$0		\$0	\$90,00	00
	3	FNALCont	0%	0 hrs	0 day	s Tue	11/4/03	Tue 1	1/4/03	\$45,0	00	\$0		\$0	\$45,00)0
	Note	s														
	enera / e nee ost: 600 ea		ngineering l	Estimate)			already durir	ng pre-pi	roduction).							

Total \$90,000

WBS			1	Name			Cos	st			
1.1.1.5	5.23				Producti	on JPC: testir	ng \$2	29,390			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	7	Elect. Engineer	25%	200 hrs	0 days	Fri 12/5/03	Thu 5/6/04	\$10,190	\$0	\$0	\$10,190
	9	Elect. Technician	100%	800 hrs	0 days	Fri 12/5/03	Thu 5/6/04	\$19,200	\$0	\$0	\$19,200
	12	Research Associate	50%	400 hrs	0 days	Fri 12/5/03	Thu 5/6/04	\$0	\$0	\$0	\$0
	Note	es									
	Labor:										
		g and basic testing done on a									
	I nis is Schedi	FNAL labor for more extensivule:	e testing o	r tne card.							
		ould test 3 boards/week = 16 v	veeks= 80d	d							
1.1.1.5	5.24			F	roduction	n JPC Availab	le	\$0			
	Note	es									
	Schedu		<u>-</u>								
	Lag tim	ne of 40 days includes 20d for	getting the	e first boards	tested.						
1.1.1.5	5 25			P	roduction	JPC Comple	te	\$0			
1.1	.1.6					Junction Card	ds \$13	35,934			

Notes

This card is linked to the finilization of the mechanical structure which dictates dimensions and support. This is the reason for having 2 prototypes.

We conservatively assume we need a card and not just connectors.

Runs:

- 1. Prototype#1 (just functionality)
- 2. Prototype#2 (specified for the final mechanical design)
- 3. Production
- 1 JC per stave + L0

Need 180 (Outer) + 24 (L0) = 204 Junction Cards for the project.

1.1.1.6	.1		Prototy	ype#1 JC:	specs, de	esign and layo	ut \$7,	495				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	7	Elect. Engineer	25%	100 hrs	0 days	Wed 6/5/02	Wed 8/14/02	\$5,095	\$0	\$0	\$5,095	
	9	Elect. Technician	25%	100 hrs	0 days	Wed 6/5/02	Wed 8/14/02	\$2,400	\$0	\$0	\$2,400	
	12	Research Associate	50%	200 hrs	0 davs	Wed 6/5/02	Wed 8/14/02	\$0	\$0	\$0	\$0	

This is a passive card (or just a simple connector) that allows the cable transition from inside to outside of the tracking volume (it's roughly located where we now have the Junction Cards for runiia). It should not have any components but it could have some power filtering.

WBS			Name			C	ost					
"Prototype#1 JC:	specs, design and la	avout" coi	ntinued									
Note		.,										
Schedu Linked	ıle: to the MPC and JPC layou	t.										
1.1.1.6.2					JC Submiss		\$0 \$0,000					
1.1.1.6.3 ID	Resource Name I	Jnits W	ork Delay	•	manufactu tart	ring Finish	\$9,000 Cost		eline Cost	Act. C	Cost Bon	n. Cost
2	FNALR&D		hrs 0 day			Ved 8/14/02	\$6,000		\$0 \$0	ACI. C		\$6,000
3	FNALCont		hrs 0 day			Ved 8/14/02	\$3,000		\$0		•	\$3,000
Note	es											
Cost:	il: ed 1 per stave. So we woul er FR4 board and compone	ents (Engine			ing and tes	iing	\$5,878					
ID	Resource Name	Units	Work	Delay	Start	Finish	(Cost	Baseline C	Cost A	Act. Cost	Rem. Cost
7	Elect. Engineer	25%	40 hrs	0 days	Fri 9/13/02			2,038		\$0	\$0	\$2,038
9	Elect. Technician	100%	160 hrs	0 days	Fri 9/13/02			3,840		\$0 ©0	\$0 \$0	\$3,840
12	Research Associate	e 50%	80 hrs	0 days	Fri 9/13/02	2 Thu 10/10	1/02	\$0		\$0	\$0	\$0
Note Labor: this is t	es he estimate for loading and	I testing.										
1.1.1.6.5			P	rototype#	1 JC Availa	ıble	\$0					
Note												
JPC ar	pose JPC availability 3 wee e NOT formally part of our me of the 1st milestone to	1st project r	nilestone (stave	electrical te	st) since the st	ave can be reado	out without	the JPC.	However we s	till would	like to have th	ne first JPC available
1.1.1.6.6					JC: evalua		\$3,057					
ID	Resource Name	Units	Work	Delay	Start	Finish		Cost	Baseline		Act. Cost	
7 12	Elect. Engineer Research Associate	25% e 50%		,	Fri 10/11/0 Fri 10/11/0			\$3,057		\$0 \$0	\$0 \$0	\$3,057 \$0

WBS				Name				C	ost						
	1.6.7				Prototy	ype#2 JC: d	esigr		\$2,03	38					
	ID	Resource Name	Units	Work	Delay	Start	Ū	Finish	า	Cost	Baseline	Cost	Act.	Cost	Rem. Cost
	7	Elect. Engineer	25%	40 hrs	0 days	Mon 12/16	6/02	Wed 1/2	2/03	\$2,038		\$0		\$0	\$2,038
	12	Research Associate	50%	80 hrs	0 days	Mon 12/16	6/02	Wed 1/2	2/03	\$0		\$0		\$0	\$0
	Note	es													
	Sched														
	Linkea	to the finilization of the mech	ianicai stru	cture aesign.											
1.1.	1.6.8			Pr	ototype#	2 JC Submi	ssior	ነ	(\$0					
1.1.	1.6.9			Protot	type#2 J0	C: manufact	uring	3	\$9,00	00					
	ID	Resource Name Ur	nits W	ork Dela	ay	Start	F	inish	Cos	st Bas	eline Cost	Act.	Cost	Ren	n. Cost
	2		0% 0	hrs 0 da	iys We	d 1/22/03	Wed	1/22/03	\$6,0		\$0		\$0		\$6,000
	3	FNALCont	0% 0	hrs 0 da	ıys We	d 1/22/03	Wed	1/22/03	\$3,0	00	\$0		\$0		\$3,000
	Note														
	We ne Cost:	ed 1 per stave. So we would	build 10 as	prototypes.											
		er FR4 board and componen	its (Engine	ering Estimat	e)										
1.1.1	6.10		P	rototype#	2 JC: Lo	ading and te	esting)	\$5,87	78					
	ID	Resource Name	Units	Work	Delay	Start		Finish	h	Cost	Baseline	Cost	Act.	Cost	Rem. Cost
	7	Elect. Engineer	25%	40 hrs	,			Wed 3/1		\$2,038		\$0		\$0	\$2,038
	9	Elect. Technician	100%	160 hrs	,			Wed 3/1		\$3,840		\$0 ©0		\$0 \$0	\$3,840
	12	Research Associate	50%	80 hrs	0 days	Thu 2/20	//03	Wed 3/1	9/03	\$0		\$0		\$0	\$0
	Note	es													
	Labor:	the estimate for loading and to	estina.												
			3												
1.1.1.	.6.11				Prototype	e#2 JC Ava	ilable	9	3	\$ 0					
1.1.1.						#2 JC evalu			\$2,03						
1.1.1.	ID	Resource Name	Units	Work	Delay	#2 3C evalu	iatioi	Finish			Baseline Co	act /	Act. Co	oct I	Rem. Cost
	7	Elect. Engineer	25%	40 hrs	0 days	Tue 7/22/0	3 1	Mon 8/18/0		2,038		\$0		\$0	\$2,038
	12	Research Associate	50%	80 hrs	0 days	Tue 7/22/0		Mon 8/18/0		\$0 \$0		\$0 \$0		\$0 \$0	\$0

	ID	Resource Name	Units					Finish	Cost	Baseline Cos		
	7 12	Elect. Engineer Research Associate	25% 50%					Thu 12/4/03 Thu 12/4/03		\$ \$		\$0 \$2,038 \$0 \$0
	Note		3070	00 111	o day	3 WCG 11/	3/03	1110 12/4/00	, φυ	Ψ	•	φο
So	chedu	ıle:										
La	ayout	can start when the MPC, JP	C, cables	and mech	anical struc	ture have been f	inalized.					
1.1.1.6.1	14				Prod	uction JC go	ahead		\$0			
1.1.1.6.1	15			P		JC: manufa		\$6	6,000			
	ID	Resource Name Ur	nits W		Delay	Start	·	•	•	aseline Cost	Act. Cost	Rem. Cost
	1					hu 12/4/03	Thu 1		4,000	\$0	\$0	\$44,000
	3				,	hu 12/4/03			2,000	\$0	\$0	\$22,000
Co Ne		04 + spares = 220	nts (Engi	neering Es	timate)							
Co Ne \$2	ost: eed 2 200 fo otal \$4		nts (Engi			_oading and	testing	\$2	23,512			
Co Ne \$2 To	ost: eed 2 200 fo otal \$4	04 + spares = 220 or FR4 boards, and compone	nts (Engi	Produc	tion JC:	Loading and ay Sta	_	\$2 Finish	:3,512 Cost	Baseline Cos	st Act. Co	st Rem. Cost
Co Ne \$2 To 1.1.1.6.1	ost: eed 2 200 fo otal \$4	04 + spares = 220 or FR4 boards, and compone 44,000		Produc	tion JC:	ay Sta	rt		•	Baseline Cos		st Rem. Cost 50 \$8,152
Co Ne \$2 To 1.1.1.6.1	ost: eed 2 200 fc otal \$4 16 ID 7	04 + spares = 220 or FR4 boards, and compone 44,000 Resource Name Elect. Engineer Elect. Technician	Units 25% 100%	Product Works 160 F	etion JC: rk De nrs 0 da nrs 0 da	ay Sta ays Fri 1/1 ays Fri 1/1	rt 6/04 ⁻ 6/04 ⁻	Finish Thu 5/6/04 Thu 5/6/04	Cost \$8,152 \$15,360	\$(\$() §	\$8,152 50 \$15,360
Co Ne \$2 To 1.1.1.6.1	ost: eed 2 200 fc otal \$4 16 ID	04 + spares = 220 or FR4 boards, and compone 44,000 Resource Name Elect. Engineer	Units	Product Works 160 F	etion JC: rk De nrs 0 da nrs 0 da	ay Sta ays Fri 1/1 ays Fri 1/1	rt 6/04 ⁻ 6/04 ⁻	Finish Thu 5/6/04	Cost \$8,152	\$0) §	\$8,152
To Ne \$2 To 1.1.1.6.1	ost: eed 2 200 fc otal \$4 16 ID 7 9 12 Note	04 + spares = 220 or FR4 boards, and compone 44,000 Resource Name Elect. Engineer Elect. Technician Research Associate	Units 25% 100%	Product Works 160 F	etion JC: rk De nrs 0 da	ay Sta ays Fri 1/1 ays Fri 1/1	rt 6/04 ⁻ 6/04 ⁻	Finish Thu 5/6/04 Thu 5/6/04	Cost \$8,152 \$15,360	\$(\$() §	\$8,152 50 \$15,360
To No. 1.1.1.6.1	ost: eed 2 200 fc otal \$4 16 ID 7 9 12 Note	04 + spares = 220 or FR4 boards, and compone 44,000 Resource Name Elect. Engineer Elect. Technician Research Associate	Units 25% 100% 50%	Product Works 160 F	etion JC: rk De nrs 0 da	ay Sta ays Fri 1/1 ays Fri 1/1	rt 6/04 ⁻ 6/04 ⁻	Finish Thu 5/6/04 Thu 5/6/04	Cost \$8,152 \$15,360	\$(\$() §	\$8,152 50 \$15,360
To No. 1.1.1.6.1	ost: eed 2 200 fc otal \$4 16 ID 7 9 12 Note	04 + spares = 220 or FR4 boards, and compone 44,000 Resource Name Elect. Engineer Elect. Technician Research Associate	Units 25% 100% 50%	Product Works 160 F	etion JC: rk De nrs 0 da	ay Sta ays Fri 1/1 ays Fri 1/1	rt 6/04 ⁻ 6/04 ⁻	Finish Thu 5/6/04 Thu 5/6/04	Cost \$8,152 \$15,360	\$(\$() §	\$8,152 50 \$15,360

We will replace all cables going from the silicon detector to the DAQ and Power Supplies racks. There are 2 sets of these cables:

• from the mini Port Card (end of stave) to the Junction Port Card

Notes

WBS			Nam	е		(Cost					
"Cables" contin	ued											
No	tes											
• fr	om the Junction Port Card	to the rack	ĸs.									
1.1.1.7.1				Cal	oles from MPC	to JPC	\$173,371					
	tes											
	e are in reality 2 sets of ca		م دام ا	tion oard (a	ianal , nawar) and a	a accord act from th	a lunation a	and to the luncti	on Dortoord	(aianal ı m		
	set from the end of the MF set is about 3 feet long	C pig-tali to	o the Junct	lion card (s	ignai + power) and a	a second set from the	e Junction C	ard to the Juncti	on Portcard	(signai + p	ower).	
Seco	nd set is about 9 feet long											
	Junction Card connects the oduction we will need 180*		ts of cables									
1.1.1.7.1.1		Finalize	cables a	nd conne	ectors for miles	tone#1	\$4,076					
ID	Resource Name	Uni	its W	ork D	elay Star	rt Finis	h (Cost Base	line Cost	Act. C	Cost	Rem. Cost
7	Elect. Engineer	25	% 80	hrs 0	days Tue 2/1	9/02 Mon 4/1	5/02 \$4	,076	\$0		\$0	\$4,076
		-1	0/ 400	\ h=0	doi/o Tuo 0/4	0/00 Man 4/4	E/02	\$0	\$0		ΦO.	ФО.
12	Research Associa	ate 50	% 160	hrs 0	days Tue 2/1	9/02 Mon 4/1	5/02	φυ	ΦU		\$0	\$0
		ate 50	% 160	nrs o	days Tue 2/1	9/02 IVION 4/ I	5/02	ΦΟ	ΦΟ		\$ 0	\$0
No	tes				•		-,	•	ΦО		φU	\$0
No			in the fina	ıl version siı	•	I we are not using th	e JPC nece	ssarely.	ΦО		ΦU	\$ 0
No Thes 1.1.1.7.1.2	tes e are not the same cables	we will use	in the fina F	l version si	nce for milestone #1	I we are not using th	e JPC nece \$7,500	ssarely.		· Cost		
Nc Thes 1.1.1.7.1.2 ID	tes e are not the same cables Resource Name	we will use	in the fina F Work	l version si Procure o Delay	nce for milestone #1 cables for miles Start	I we are not using th tone#1 Finish	e JPC nece \$7,500 Cost	ssarely.	Cost Act	Cost	Rem.	Cost_
No Thes 1.1.1.7.1.2	tes e are not the same cables	we will use	in the fina F Work 0 hrs	l version si	nce for milestone #1	I we are not using th	e JPC nece \$7,500	ssarely.		Cost \$0 \$0	Rem.	
1.1.1.7.1.2 ID 2	Resource Name FNALR&D FNALCont	we will use Units 0%	in the fina F Work 0 hrs	l version si Procure o Delay 0 days	nce for milestone #1 cables for miles Start Mon 4/15/02	we are not using th tone#1 Finish Mon 4/15/02	e JPC nece \$7,500 Cost \$5,000	ssarely.	Cost Act	\$0	Rem.	Cost
1.1.1.7.1.2 ID 2 3	Resource Name FNALR&D FNALCont	we will use Units 0% 0%	Work 0 hrs 0 hrs	Procure of Delay 0 days 0 days	cables for miles Start Mon 4/15/02 Mon 4/15/02	we are not using the tone#1 Finish Mon 4/15/02 Mon 4/15/02	e JPC nece \$7,500 Cost \$5,000 \$2,500	ssarely. Baseline C	Cost Act \$0 \$0	\$0 \$0	Rem. \$9 \$2	Cost
1.1.1.7.1.2 ID 2 3 No Thes	Resource Name FNALR&D FNALCont	we will use Units 0% 0% cables from	Work O hrs O hrs	Procure of Delay 0 days 0 days to the JPC	cables for miles Start Mon 4/15/02 Mon 4/15/02 since the JPC may	we are not using the tone#1 Finish Mon 4/15/02 Mon 4/15/02	e JPC nece \$7,500 Cost \$5,000 \$2,500	ssarely. Baseline C	Cost Act \$0 \$0	\$0 \$0	Rem. \$9 \$2	Cost
No Thes 1.1.1.7.1.2 ID 2 3 No Thes Neec Cost	Resource Name FNALR&D FNALCont tes e are not necessarely the 5 sets (4m long) with con	Units 0% 0% cables from	Work O hrs O hrs	Procure of Delay 0 days 0 days to the JPC	cables for miles Start Mon 4/15/02 Mon 4/15/02 since the JPC may	we are not using the tone#1 Finish Mon 4/15/02 Mon 4/15/02	e JPC nece \$7,500 Cost \$5,000 \$2,500	ssarely. Baseline C	Cost Act \$0 \$0	\$0 \$0	Rem. \$9 \$2	Cost
No Thes 1.1.1.7.1.2 ID 2 3 No Thes Neec Cost \$1,00	Resource Name FNALR&D FNALCont tes e are not necessarely the 5 sets (4m long) with con	Units 0% 0% cables from	Work O hrs O hrs	Procure of Delay 0 days 0 days to the JPC	cables for miles Start Mon 4/15/02 Mon 4/15/02 since the JPC may	we are not using the tone#1 Finish Mon 4/15/02 Mon 4/15/02	e JPC nece \$7,500 Cost \$5,000 \$2,500	ssarely. Baseline C	Cost Act \$0 \$0	\$0 \$0	Rem. \$9 \$2	Cost
No Thes 1.1.1.7.1.2 ID 2 3 No Thes Neec Cost \$1,00	Resource Name FNALR&D FNALCont tes e are not necessarely the 5 sets (4m long) with con	Units 0% 0% cables from	Work O hrs O hrs	Procure of Delay O days O days to the JPC	cables for miles Start Mon 4/15/02 Mon 4/15/02 since the JPC may	I we are not using the stone#1 Finish Mon 4/15/02 Mon 4/15/02 not be part of milest	e JPC nece \$7,500 Cost \$5,000 \$2,500	ssarely. Baseline C	Cost Act \$0 \$0	\$0 \$0	Rem. \$9 \$2	Cost
No Thes 1.1.1.7.1.2 ID 2 3 No Thes Need Cost \$1,00 Total	Resource Name FNALR&D FNALCont tes e are not necessarely the 5 sets (4m long) with con	Units 0% 0% cables from	Work O hrs O hrs	Procure of Delay O days O days to the JPC	cables for miles Start Mon 4/15/02 Mon 4/15/02 since the JPC may estone#1	I we are not using the stone#1 Finish Mon 4/15/02 Mon 4/15/02 not be part of milest	e JPC nece \$7,500 Cost \$5,000 \$2,500 one#1. Thes	Baseline C	Sost Act \$0 \$0 \$0	\$0 \$0	Rem. \$5 \$2 tone #1	Cost
No Thes 1.1.1.7.1.2 ID 2 3 Mo Thes Neec Cost \$1,00 Total	Resource Name FNALR&D FNALCont tes e are not necessarely the 5 sets (4m long) with con 00 per set (Engineering Es \$5,000	units 0% 0% cables from nectors for timate) Units	Work O hrs O hrs o hrs the MPC testing sta	Procure of Delay O days O days to the JPC aves for mile	cables for miles Start Mon 4/15/02 Mon 4/15/02 since the JPC may estone#1 esting for milest Start	tone#1 Finish Mon 4/15/02 Mon 4/15/02 not be part of milester	e JPC nece \$7,500 Cost \$5,000 \$2,500 one#1. Thes \$1,920 Cos	Baseline C se are just "funct	Sost Act \$0 \$0 \$0	\$0 \$0	Rem. \$8 \$2 tone #1	Cost 5,000 2,500

WBS				Name			Cost				
1.1.1.7	'.1.5		Finaliz	e productio	on cables	and connector	s \$8,	994			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	7	Elect. Engineer	25%	120 hrs	0 days	Fri 11/15/02	Thu 2/20/03	\$6,114	\$0	\$0	\$6,114
	9	Elect. Technician	25%	120 hrs	0 days	Fri 11/15/02	Thu 2/20/03	\$2,880	\$0	\$0	\$2,880
	12	Research Associate	50%	240 hrs	0 days	Fri 11/15/02	Thu 2/20/03	\$0	\$0	\$0	\$0

Schedule:

After the first DAQ chain has been tested, we can finilize the cables and connectors.

These are now the prototype/preproduction cables.

1.1.1.7.	1.6	MPC-JP				Connectors F		\$	0		
1.1.1.7.	1.7			P		ables for miles		\$21,55			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
-	2	FNALR&D	0%	0 hrs	0 days	Fri 5/23/03	Fri 5/23/03	\$14,367	\$0	\$0	\$14,367
	3	FNALCont	0%	0 hrs	0 days	Fri 5/23/03	Fri 5/23/03	\$7,184	\$0	\$0	\$7,184

Notes

General:

These are the prototype/preproduction cables.

Cost

Based on quotation XXXX

1. Signal cable:

we'll buy spools of twisted pairs @ \$263.00 for 1000 feet. One signal cable will have 25 pairs. Each complete cable set per MPC (to and from the JC) is 25*(3'+9')=300 feet at 0.263 per foot = \$80 per set of signal cables (covers 1 MPC worth).

Termination of signal cables is done outside FNAL and price depends on quantity:

terminating 1-9 cables is \$144 per termination (4 terminations per set)

terminating 10-24 cables is \$109 per termination

Total price per set (1 MPC worth) is then \$80 + \$(4*109) = \$516 per set.

2. Power Cable:

For both power cables going to and coming from the Junction card the price is the same as for production. \$70 per set.

3. HV cable:

we assume that the HV cable is the same as the Signal Cable. This is achieved by simply adding 4 more conductors to the signal cable.

Total to be added is 4*(3'+9')=48 feet at 0.263 per foot = \$12.624 per set of HV cable (covers 1 MPC worth). Termination costs are included already in the signal cables.

In preproduction we'll make 24 MPC worth of such cables.

Total cost is is 24*(70+516+12.624) = 14.367 K\$

WBS	}			Name	·		Co	ost			
1.1.1	.7.1.8					cable te		\$1,920			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	9	Elect. Technician	50%	80 hrs	0 days	Tue 7/22/03	Mon 8/18/03	\$1,920	\$0	\$0	\$1,920
	Not	es									
	Labor:	nation and testing will be d	lone at the	company F	Here is just (considered the final	check at FNAI				
		nation and testing will be e									
1.1.1						tion cables ava		\$0			
1.1.1.7			Prod	duction g	o ahead o	on MPC -JPC o	ables	\$0			
	Not Sched										
		to the test on the preprodu	uction DAC	Q chain.							
1.1.1.7	'.1.11			Prod	curement	of MPC-JPC o	ables \$	121,650			
	ID	Resource Name	Units	_	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Tue 10/14/03	Tue 10/14/03	\$81,100	\$0	\$0	\$81,100
	3	FNALCont	0%	0 hrs	0 days	Tue 10/14/03	Tue 10/14/03	\$40,550	\$0	\$0	\$40,550
	Not	es									
	Cost: Based	on quotations									
		•									
		ction costs is (test will be on the cast of the cast o									
	cab	le termination (2) \$77	.00 per ter	mination (+d	connector+la	abor)					
	cab		.00 per ter	mination (+d	connector+la						
		ver cable (MPC to JC) \$30 ver cable (JC to JPC) \$40									
	5. HV	(JC to JPC) included in the	he signal c	ables as 4 e	extra conduc	, iabbi and connecti ctors	ors)				
	6. HV	(MPC to JC) included in	the signal	cables as 4	extra condu	uctors					
		cost is (180 sets needed +									
	200 *((9'+3')*8.113 + 77 * 4) + 7	70) = 200*	405.356 = \$	81,071.20						
1.1.1.7	'.1.12					cable te	esting	\$5,760			
	ID	Resource Name	Units	Work	Delay		Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	9	Elect. Technician	50%	240 hrs	0 days	Fri 12/12/03	3 Thu 3/18/04	\$5,760	\$0	\$0	\$5,760
	Not	es									
	Labor:										

Basic tests will be done by the manufacturer. At FNAL just the final tests prior to intallation.

WBS			Nar	ne					Cost						
"cable testing"	continued														
	ites														
Sche			. 41 4:	- 											
A leg	time of 40 days has been	added froi	n the time	or procur	ement.										
1.1.1.7.1.13			MPC-	JPC prod	duction	cables av	vailabl	е	\$	60					
1.1.1.7.1.14				Prod	duction	cables co	mplet	е	\$	80					
_Nc	tes														
	ys lag time allowed for add need 200 sets for the detec		ctors and	testing.											
1.1.1.7.2				Cal	oles fro	m JPC to	Crate	S	\$147,17	7 0					
No.	ites														
3. Hi 4. se The I	wer (JPC to Power Supply gh Voltage (JPC to Power nsing wire for the LV powe High Voltage cable and se length is about 60 feet.	Supply) er (JPC to l nse cable o	could be t	he same a		ver cable (all			pplies). \$4,07	7 6					
ID	Resource Name	Un	its V	Vork	Delay	Sta	rt	Finis	sh	Cost	Baseline	Cost	Act. (Cost	Rem. Cost
7	Elect. Engineer				0 days			Mon 4/	15/02	\$4,076		\$0		\$0	\$4,076
12	Research Associa	ate 50)% 16	0 hrs	0 days	Tue 2/2	19/02	Mon 4/	15/02	\$0		\$0		\$0	\$0
No	tes														
Sche						126									
IInke		re not tne i	inai cabie	s, just san	ne functio	nality									
	d to milestone #1. These a														
1.1.1.7.2.2	i to milestone #1. These a			Procure	cables	for miles	tone #	1	\$7,50)0					
1.1.1.7.2.2 ID		Units	Work			for miles Start		1 inish	\$7,50 Cost		line Cost	Act. (Cost	Rem.	Cost
<u>ID</u>	Resource Name FNALR&D	Units 0%	Work 0 hrs	Delay 0 days	s Tue	Start 4/16/02	F Tue	inish 4/16/02	Cost \$5,000	Base	\$0	Act. (\$0	\$5	5,000
ID	Resource Name	Units	Work	Delay	s Tue	Start	F Tue	inish	Cost	Base		Act.		\$5	
ID 2 3	Resource Name FNALR&D	Units 0%	Work 0 hrs	Delay 0 days	s Tue	Start 4/16/02	F Tue	inish 4/16/02	Cost \$5,000	Base	\$0	Act.	\$0	\$5	5,000

Cost:

\$1,000 per set (Engineering Estimate)
Total \$5,000

WDC				Nome			0					
WBS				Name			Cos	3 T 				
1.1.1.7.	2.3			С	able testii	ng for milestone	e #1 \$	\$1,920				
	ID	Resource Name \l	Jnits	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	9	Elect. Technician	50%	80 hrs	0 days	Wed 6/12/02	Wed 7/10/02	\$1,920	\$0	\$0	\$1,920	
	Not	es										
	Labor:											
•	This is	for terminating cables and te	esting.									
1117	1.1.1.7.2.4 JPC-Crates cables available for milestone #1 \$0											
1.1.1.7.	∠. 4	JI	- C-Ciai	ies cabie	to avallar	ie ioi iilliesione	; # I	φυ				
1.1.1.7.	2.5		Finali	ze produ	iction cab	les and connec	tors \$	8,994				
	ID	Resource Name	Units	Wor	k Dela	y Start	Finish	Cost	Baseline Cos	t Act. Cos	t Rem. Cost	
	7	Elect. Engineer	25%	120 h	rs 0 day	/s Fri 11/15/0	2 Thu 2/20/0	3 \$6,114	\$() \$(\$6,114	
	9	Elect. Technician	25%	120 h	rs 0 da	/s Fri 11/15/0	2 Thu 2/20/0	3 \$2,880	\$() \$(\$2,880	
	12	Research Associate	25%	120 h	rs 0 da	/s Fri 11/15/0	2 Thu 2/20/0	3 \$0	\$() \$(\$0	
	Not	es										
	Sched	ule: he first DAO chain has been	tootod w	a aan finili a	a tha aablaa	and assumestars						

After the first DAQ chain has been tested, we can finilize the cables and connectors.

These are now the prototype/preproduction cables.

1.1.1.7.	2.6		es Prod	uction C	ables and	d Connectors F	inilized	\$0				
1.1.1.7.	2.7					ables for milest		\$15,750				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	2	FNALR&D	0%	0 hrs	0 days	Thu 2/20/03	Thu 2/20/03	\$10,500	\$0	\$0	\$10,500	
	3	FNALCont	0%	0 hrs	0 days	Thu 2/20/03	Thu 2/20/03	\$5,250	\$0	\$0	\$5,250	

Notes

These are prototype/preproduction cables to be used fro the preproduction milestone.

Cost:

Based on the price of the IIa project.

Cost includes terminated cables + connectors + Labor.

We assume here all separate cables.

Need 5 sets for preproduction + 2 spare = 7 sets

6 cables for signals (5 data, 1 is control and clocks), \$170*6 = \$1,020 per JPC

1 cable for HV, \$50 per JPC

1 cable for power \$260 per JPC

1 cable for sensing \$170 per JPC

Total is \$1,500 per JPC set. With we have 10.5 K\$

					cable	testing	\$1,920			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
9	Elect. Technician	50%	80 hrs	0 days	Fri 4/18/03	Thu 5/15/03	\$1,920	\$0	\$0	\$1,920
Not	tes									
Labor	: just for testing cables (no	o terminativ	n required	١						
u iio io	just for testing capies (fit) terrimanc	ni required	<i>)</i>						
1.7.2.9		Prep	roductio	n JPC-Cı	rates cables av	/ailable	\$0			
.7.2.10		Prod	luction a	o ahead (on JPC-Crates	cables	\$0			
		1 100	action g				garanaan aan in ay			
.7.2.11				Procu	rement of JPC	cables	\$101,250			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	FNALEQ	0%	0 hrs	0 days	Tue 9/16/03	Tue 9/16/03	\$67,500	\$0	\$0	\$67,500
1		00/	0 hrs	0 days	Tue 9/16/03	Tue 9/16/03	\$33,750	\$0	\$0	\$33,750
1	FNALCont	0%	0 1113	,						
1 3 Not	FNALCont		01113	,						
Not	FNALCont		01113	,						
Not	FNALCont		01113	,						
Not	FNALCont		01113							

Total is \$1,500 per JPC. With 40 (needed) + 5 spares we have 67.5 K\$

1 cable for power \$260 per JPC 1 cable for sensing \$170 per JPC

1.1.1.7.2.1	12					cable testir	ng \$	\$5,760			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
_	9	Elect. Technician	50%	240 hrs	0 days	Wed 11/12/03	Thu 2/19/04	\$5,760	\$0	\$0	\$5,760
ı	Note	es									
La	bor:										
thi	is is ju	ust for testing cables (no	termination	n required)							
1.1.1.7.2.	13			Prod	luction JP	'C cables availab	le	\$ 0			

WBS			Name			Cost				
1.1.1.7.2.14			Produ	ction JPC	cables comple	ete	\$ 0			
Note	es.									
	lag time allowed for addinged 40 sets for the detector.		s and testing	J.						
1.1.1.8					FTI	VIs \$18	3,707			
Note	eS .									
Old FTI Here we	TMs are needed because we was can be easily made "ne e estimate the highest prices one FTM every 2 JPC.	ew" by simpl	ly substituting	g the old opt	eceiver for the data. ical tx/rx part with s	andard tx/rx.				
Runs: 1. Proto 3. Prod										
Need 2	3 FTM for the project									
1.1.1.8.1		n	nodify exi	sting FTN	1 for milestone	#1	\$408			
ID	Resource Name	Units		Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
7	Elect. Engineer	5%	8 hrs	0 days	Tue 3/19/02	Mon 4/15/02	\$408	\$0	\$0	\$408
12	Research Associate	e 25%	40 hrs	0 days	Tue 3/19/02	Mon 4/15/02	\$0	\$0	\$0	\$0
Note	es .									
Genera	l:									
this is ju	ust a modification of one e	xisting FTM	card, replac	ing the optic	al tx/rx part with a c	opper conventional	one.			
1.1.1.8.2			F	·TM readv	/ for milestone	#1	\$0			
		_								
1.1.1.8.3		Pro		-	design and layo		2,064			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	
ID 7	Elect. Engineer	Units 100%	Work 320 hrs	Delay 0 days	Start Fri 11/15/02	Finish Thu 1/23/03	Cost \$16,304	\$0	\$0	\$16,304
ID		Units 100%	Work	Delay	Start	Finish	Cost			\$16,304
ID 7	Elect. Engineer Elect. Technician	Units 100%	Work 320 hrs	Delay 0 days	Start Fri 11/15/02	Finish Thu 1/23/03	Cost \$16,304	\$0	\$0	\$16,304
ID 7 9 Note Schedu	Elect. Engineer Elect. Technician	Units 100% 75%	Work 320 hrs 240 hrs	Delay 0 days 0 days	Start Fri 11/15/02 Fri 11/15/02	Finish Thu 1/23/03 Thu 1/23/03	Cost \$16,304 \$5,760	\$0 \$0	\$0	\$16,304
ID 7 9 Note Schedu	Elect. Engineer Elect. Technician	Units 100% 75%	Work 320 hrs 240 hrs	Delay 0 days 0 days	Start Fri 11/15/02 Fri 11/15/02	Finish Thu 1/23/03 Thu 1/23/03	Cost \$16,304 \$5,760	\$0 \$0	\$0	\$16,304
ID 7 9 Note Schedu This is	Elect. Engineer Elect. Technician	Units 100% 75%	Work 320 hrs 240 hrs e. preproduc	Delay 0 days 0 days ction) and co	Start Fri 11/15/02 Fri 11/15/02 mes at the end of the	Finish Thu 1/23/03 Thu 1/23/03 The testing of the pro	Cost \$16,304 \$5,760	\$0 \$0	\$0	\$16,304
ID 7 9 Note Schedu	Elect. Engineer Elect. Technician	Units 100% 75%	Work 320 hrs 240 hrs e. preproduc	Delay 0 days 0 days ction) and co	Start Fri 11/15/02 Fri 11/15/02	Finish Thu 1/23/03 Thu 1/23/03 The testing of the proon	Cost \$16,304 \$5,760	\$0 \$0	\$0	\$16,304
ID 7 9 Note Schedu This is 1.1.1.8.4	Elect. Engineer Elect. Technician es lle: intended to be the final FT	Units 100% 75% M design (i.	Work 320 hrs 240 hrs e. preproduc	Delay 0 days 0 days ction) and co	Start Fri 11/15/02 Fri 11/15/02 mes at the end of the FTM Submissi TM: procurement	Finish Thu 1/23/03 Thu 1/23/03 The testing of the proon	Cost \$16,304 \$5,760 stotype DAQ o \$0 9,000	\$0 \$0	\$0 \$0	\$16,304

WBS				Nan	ne				Cost					
"Prototype	FTM:	procurement" cont	inued											
71	ID	Resource Name	Units	Work	Delay	5	Start	Finish	Cost	Baseline Cost	t Ac	t. Cost	Rem. Cost	
	3	FNALCont	0%	0 hrs	0 days	Thu	1/23/03	Thu 1/23/03	\$9,000	\$0)	\$0	\$9,000	
	Not	es		-										
	Need Cost:	10 cards as preproduction	n.											
	based	on the price of the IIa FT												
	\$3,000	per board (includes com	nponents,	assemblin	g, connect	ors etc.).								
11	1.8.6		Prot	otype F	TM: acc	ombling	and evalu	ıation	\$8,206					
1.1.	ID	Resource Name	Un	• •		Delay	Start	Finish		t Baseline Co	ost A	Act. Cos	t Rem. Cost	
	7	Elect. Engineer				0 days	Fri 3/21/0				\$0	\$(
	9	Elect. Technician				0 days	Fri 3/21/0		. ,		\$0	\$0		
	12	Research Associa	ate 50)% 24	0 hrs (0 days	Fri 3/21/0	03 Fri 6/13/	03 \$	60	\$0	\$0	0 \$0	
	Not			.										
	Labor:	bling labor is costed in th	ne manufa	cturing.										
	Labor	here is just for testing the	e card with	the DAQ	system.									
1.1.	1.8.7				Р	rototype	e FTM ava	ilable	\$0					
1.1.	1.8.8		Pr	oductio	n FTM: ទ	spec, de	esign and I	ayout	\$22,064					
	ID	Resource Name	Units	Wo	rk De	elay	Start	Finish	Co	st Baseline	Cost	Act. C	ost Rem. Cost	
	7	Elect. Engineer	100%			,	Mon 6/16/0		. ,		\$0		\$0 \$16,304	
	9	Elect. Technician	75%	240	hrs 0 c	days N	Mon 6/16/0	3 Mon 8/11	/03 \$5,	760	\$0		\$0 \$5,760	
1.1.	1.8.9				Produc	tion go	ahead on	FTMs	\$0					
	Not	es		_										
	Sched	ule: to the production go-ahe	ad for cab	los										
		to the production go and	ad for cab											
1.1.1.							on: procure		\$78,000					
	1D 2	Resource Name FNALR&D	Units 0%	Work 0 hrs	Delay		Start 9/16/03	Finish Tue 9/16/03	Cost	Baseline Cost		t. Cost \$0	Rem. Cost	
	3	FNALRAD	0% 0%	0 hrs	0 days 0 days			Tue 9/16/03	\$60,000 \$18,000	\$0 \$0		\$0 \$0	\$60,000 \$18,000	
	Not		- , •	- · · · · ·	,				,	4.	-	+ -	¥ - -,	
	Cost:			•										
	based	on FTM cost for IIa.												

WBS			1	Name			Cost				
	n. prod	curement" continued									
Troductio	Note										
		per board (includes compone 23 + spares = 30 FTM. 60,000	ents, assen	nbling, conne	ctors etc.).						
1.1.1.	8.11		Proc	duction: as	sembling	and evaluation	\$13,96	6			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	7 9	Elect. Engineer Elect. Technician	10% 100%	48 hrs 480 hrs	0 days 0 days	Wed 10/15/03 Wed 10/15/03	Thu 1/22/04 Thu 1/22/04	\$2,446 \$11,520	\$0 \$0	\$0 \$0	\$2,446 \$11,520
	12	Research Associate	25%	120 hrs	0 days	Wed 10/15/03	Thu 1/22/04	\$0	\$0	\$0	\$0
1.1.1. 1.1.1.	Labor I 8.12	es bling labor is costed in the manere is just for testing the card		AQ system. P		FTM available	\$ \$				
	Note	es			oddolloi i	Tivio complete	Ψ				
	40days	s lag time allowed for adding c	onnectors	and testing.							
1.1	vve ne 1.1.9	ed 40 sets for the detector.		D.	AQ Testir	ng & Readiness	\$173,74	8			
	Note	es									
	(oscillo	s the cost of all electrical testin scope etc. is needed). 50% contingency	ng (M&S) a	t FNAL. Inclu	des DAQ sta	ands, Burn-in stations	s, computers, miscel	lanea PC boai	rds and material, cabl	es, tools and ins	trument
1.1.1	1.9.1			Testing	of Prototy	pe DAQ Chain	\$66,11	4			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	2	FNALR&D	0%	0 hrs	0 days	Wed 8/21/02	Wed 8/21/02	\$40,000	\$0	\$0	\$40,000
	3	FNALCont	0%	0 hrs	0 days	Wed 8/21/02	Wed 8/21/02	\$20,000	\$0	\$0 \$0	\$20,000
	7 12	Elect. Engineer Research Associate	25% 100%	120 hrs 480 hrs	0 days	Thu 8/22/02 Thu 8/22/02	Thu 11/14/02 Thu 11/14/02	\$6,114 \$0	\$0 \$0	\$0 \$0	\$6,114 \$0
	12	Nesealth Associate	100%	400 1118	0 days	111U 0/22/UZ	1110 11/14/02	φU	Φυ	φυ	ΦΟ

Test begins when 1st prototype electrical stave is available.

These are specific tests aimed at understanding the functionality of the stave concept.

WBS Name Cost

"Testing of Prototype DAQ Chain" continued

Notes

Here is calculated the cost of all electrical testing (M&S) at FNAL up to this phase.

Includes upgrade to DAQ stands and Burn-in stations, new computers, bench power suppplies, miscellanea boards and material, cables, tools and instruments.

Most of the above equipment is already available from the IIa effort. This is mostly to upgrade and modify what is already there. Labor:

This is the labor specifically assigned to understand the DAQ issues and get all the testing equipment ready for production. It is in parallel with the labor assigned to test chips, hybrids, modules and staves.

1.1.1.9.2				esting of P	reproduc	tion DAQ chain	\$107,63	4			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
-	1	FNALEQ	0%	0 hrs	0 days	Tue 9/16/03	Tue 9/16/03	\$60,000	\$0	\$0	\$60,000
	3	FNALCont	0%	0 hrs	0 days	Tue 9/16/03	Tue 9/16/03	\$30,000	\$0	\$0	\$30,000
	7	Elect. Engineer	25%	120 hrs	0 days	Wed 9/17/03	Thu 12/11/03	\$6,114	\$0	\$0	\$6,114
	9	Elect. Technician	100%	480 hrs	0 days	Wed 9/17/03	Thu 12/11/03	\$11,520	\$0	\$0	\$11,520
	12	Research Associate	50%	240 hrs	0 days	Wed 9/17/03	Thu 12/11/03	\$0	\$0	\$0	\$0

Notes

Test begin when 1st preproduction stave is available.

All various pieces should be ordered for production quantities based on this final test.

Decision to proceed with ordering production quantities parts is marked by milestone #4

Cost:

Here is the cost of further electrical testing (M&S) equipment at FNAL. Includes DAQ stands, Burn-in stations, computers, miscellanea PC boards and material, cables, tools and instrument (oscilloscope etc. if needed).

added 50% contingency

1.1.1.9.3 Milestone#4: DAQ Production Go-Ahead \$0

Notes

This date marks the end of all decisions regarding ordering production quantities for all DAQ parts.

1.1.1.1	0					Power Supply	/ system	\$772	2,200			
1	D	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
-;	3	FNALCont	0%	0 hrs	0 days	Tue 4/2/02	Tue 4/2/02	\$0	\$0	\$0	\$0	-

Notes

We need a new power supply system in order to provide power to the detector.

Main characteristics are to provide power separately for the chip (AVDD,DVDD0, MPC,JPC and two HV line per stave (one per each side).

Channel count for the above scheme is provided in the table.

WBS Name Cost

"Power Supply system" continued

Notes

Power Supply

Layer	R/O	JPC	L V	H V
	Chains			
5	60	12	192	120
4	4 8	10	154	96
3	3 6	8	116	7 2
2	2 4	6	7 8	4 8
1	1 2	4	48	2 4
0	7 2	16	232	7 2
TOTAL	252	56	820	432

1.1.1.10.1 Selection of New Supplies \$0

ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
16	NonFnal Labor	25%	80 hrs	0 days	Tue 4/2/02	Tue 5/28/02	\$0	\$0	\$0	\$0

Notes

Search the market for available solutions.

Labor:

Done at INFN-Padova.

Estimated in 0.25 FTE

1.1.1.10	0.2				Pro	ocure sample s	upplies	\$20,000			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cos
_	4	ItalyEQ	0%	0 hrs	0 days	Tue 5/28/02	Tue 5/28/02	\$20,000	\$0	\$0	\$20,00

Notes

We need to have these ready to use for milestone#1.

Cost:

Based on CAEN quotation:

- 1. Crate \$10,000
- 2. module A1551-HV \$3,100
- 3. module A1518-LV \$2,900
- 4 cables, connectors, load box, miscellanea material \$1,500

Total \$17,500 + \$2,500 contingency = \$20,000

WBS				Name			Cos	t			
1.1.1.10	0.3		Т			s of Power supp		\$0			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
_	16	NonFnal Labor	100%	480 hrs	0 days	Thu 8/22/02	Thu 11/14/02	\$0	\$0	\$0	\$0
	Nlote	20									

These tests are aimed at checking that the functionality of the new system is compatible with the runiib deisgn and needs. Labor:

Done at INFN-Padova. No FNAL labor

Estimated labor 1.0 FTE

1.1.1.10.4 Evaluate power supplies \$8,994 Resource Name Units Work Delav Start Finish Cost **Baseline Cost** Act. Cost Rem. Cost Elect. Engineer 0 days Fri 11/15/02 Thu 2/20/03 \$0 120 hrs \$6.114 \$0 \$6.114 25% 0 days Fri 11/15/02 Thu 2/20/03 \$0 \$0 Elect. Technician 120 hrs \$2,880 \$2,880 NonFnal Labor 240 hrs 0 days Fri 11/15/02 Thu 2/20/03 \$0 \$0 16 50% \$0 \$0

Notes

Schedule:

Sample power supplies will be used for milestone#1

Labor:

This is the final System test with the electrical stave and is done at FNAL.

- 1. Elect. Engineer (25%) support
- 2. Elect. Technician (25%) support
- 3. Elect. Technician (50%) from INFN-Padova

1.1.1.10.5 Final Decision on Power Supply System \$0

Notes

This milestone marks the decision point on the power supply system.

1.1.1.10	0.6		Р	atch Pane	el: design	and prototyping	otyping \$7,934				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
<u> </u>	1	FNALEQ	0%	0 hrs	0 days	Thu 12/11/03	Thu 12/11/03	\$2,000	\$0	\$0	\$2,000
	3	FNALCont	0%	0 hrs	0 days	Thu 12/11/03	Thu 12/11/03	\$2,000	\$0	\$0	\$2,000
	7	Elect. Engineer	10%	32 hrs	0 days	Fri 12/12/03	Thu 2/19/04	\$1,630	\$0	\$0	\$1,630
	9	Elect. Technician	30%	96 hrs	0 days	Fri 12/12/03	Thu 2/19/04	\$2,304	\$0	\$0	\$2,304
	12	Research Associate	50%	160 hrs	0 days	Fri 12/12/03	Thu 2/19/04	\$0	\$0	\$0	\$0

Notes

The patch panel is necessary to map the HV and LV power supply channels to the JPCs.

Cost:

based on physicist estimate.

\$2,000 per panel including connectors, terminations, patch panel cabling etc.

Protoype is 1 panel.

Cost "Patch Panel: design and prototyping" continued Notes 100% contingency applied. Labor: 1. Research Associate (40%) 2. elect. technician (30%) 3. elect. engineer (10%) \$0 1.1.1.10.7 Power supply Production go ahead Power Supply: procurement \$683,000 1.1.1.10.8 **Baseline Cost** Act. Cost Rem. Cost Resource Name Units Work Delay Start Finish Cost **FNALEQ** 0% 0 hrs 0 days Thu 2/19/04 Thu 2/19/04 \$333,000 \$0 \$0 \$333,000 **FNALCont** 0% Thu 2/19/04 Thu 2/19/04 \$150,000 \$0 \$0 \$150,000 0 hrs 0 days ItalyEQ 0 hrs 0 days Thu 2/19/04 Thu 2/19/04 \$200,000 \$0 \$0 \$200,000 Notes Cost: Based on a budgetary CAEN quote for off the shelf power supplies suitable for our system. Total number of channels are ~500 HV and ~900 LV including spares. Total cost \$500.000 and includes crates. Contingency is 30% \$33K added for indirect costs (16.6% on the first \$200K) Production Power Supply Available \$0 1.1.1.10.10 Power Supply: Testing \$21,120 Act. Cost ID Resource Name Units Work Delav Start Finish Cost Baseline Cost Rem. Cost Elect. Technician 100% 880 hrs 0 davs Mon 6/14/04 Tue 11/16/04 \$21,120 \$0 \$0 \$21,120 Research Associate 25% 220 hrs 0 days Mon 6/14/04 Tue 11/16/04 \$0 \$0 \$0 \$0 NonFnal Labor 176 hrs 0 days Mon 6/14/04 Tue 11/16/04 \$0 \$0 \$0 \$0 Notes Labor: Production tests will be done at FNAL. this is estimated from the runiia experience We assume that 2 power supply modules can be tested per day. ~110 modules needed.

Power Supply Complete

1.1.1.10.11

WBS				Name			Co	ost			
1.1.1.10).12				Pato	ch Panel: produ	action S	\$31,152			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Thu 4/15/04	Thu 4/15/04	\$15,000	\$0	\$0	\$15,000
	3	FNALCont	0%	0 hrs	0 days	Thu 4/15/04	Thu 4/15/04	\$15,000	\$0	\$0	\$15,000
	9	Elect. Technician	10%	48 hrs	0 days	Fri 4/16/04	Mon 7/12/04	\$1,152	\$0	\$0	\$1,152

Notes

Cost:

Based on Physicist estimate of 1.5K\$/panel for production.

Need 8 panels + 2 spares = 15K\$

Added 100% contingency.

Labor:

This is for testing the panels (parts and assembly included in the cost).

1. Elect. Technician (10%) ~ 1week of work

1.1.1.11 SVT upgrade \$382,200

Notes

The SVT is part of the trigger system for CDF. The upgrade consists in making more of boards already existing and/or modifying existing boards. University of Chicago and INFN-Pisa are providing engineering time, labor and equipment for these parts.

1.1.1.11.1	Upgrade SVT trackfitters	\$273,000

ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1	FNALEQ	0%	0 hrs	0 days	Thu 12/11/03	Thu 12/11/03	\$210,000	\$0	\$0	\$210,000
3	FNALCont	0%	0 hrs	0 days	Thu 12/11/03	Thu 12/11/03	\$63,000	\$0	\$0	\$63,000

Notes

It is not yet clear whether we need to re-build these boards or the present functionality will suffice for Ilb. We assume we have to re-build them.

Cost:

based on the cost of the present boards for IIa.

Total cost is 210K\$ for 17 track fitter boards which include spares.

Labor:

Costed in the board except for testing.

Testing provided by U. Chicago.

No FNAL labor.

1.1.1.11	1.2				Upgrad	le SVT merger b	oards	\$109,200			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
_	1	FNALEQ	0%	0 hrs	0 days	Thu 12/11/03	Thu 12/11/03	3 \$84,000	\$0	\$0	\$84,000
	3	FNALCont	0%	0 hrs	0 days	Thu 12/11/03	Thu 12/11/03	3 \$25,200	\$0	\$0	\$25,200

Notes

We need to build an additional 12 merger

Cost:

WBS	Name		Cost	
"Upgrade SVT merger boar	ds" continued			
Notes				
based on the cost of	the present boards for IIa.			
Total cost is 84k\$ for	12 additional merger boards.			
Spares are the same	as for IIa.			
Labor:				
	cost except for testing.			
Testing provided by I	NFN-Pisa.			
1.1.2		Sensors	\$2,296,246	
Notes				

The table below summarises the type and number of sensors needed:

WBS	Name	e Cos	t
"Sensors" continued			
Notes			
-			

Silicon Sensors

Layer	Type	Φ-seg.	Z-seg.	Length	Width	Pitch	Total
5	A	30	6	96.4	40.5	75/37.5	360
5	A	30	6	96.4	40.5	75/37.5	360
4	A	24	6	96.4	40.5	75/37.5	288
4	2.5°	24	6	96.4	43.1	80/40	288
3	A	18	6	96.4	40.5	75/37.5	216
3	2.5°	18	6	96.4	43.1	80/40	216
2	A	12	6	96.4	40.5	75/37.5	144
2	2.5°	12	6	96.4	43.1	80/40	144
1	A	6	6	96.4	40.5	75/37.5	72
1	A	6	6	96.4	40.5	75/37.5	72
0	A	12	6	96.4	14.8	50/25	144

	Sensors Quantity	Total (+ 20% spares)
Outer Axials	1512	1814
Outer Stereo	648	778
LO	144	172
TOTAL	2304	2764

1.1.2.1 Outer layers \$2,150,566

Notes

We are going to prototype the outer stereo and Axials sensors.

^{1.} Prototypes Axials and Small Angle Stereo (30 grade "A"+30 grade "B" each)

Cost

"Outer layers" continued

Notes

2. Production (Axials, SAS and L0)

Need 1512 Axials and 648 Small Angle Stereo for the project.

1.1.2.1.1 Dummy Sensors: layout

ID Resource Name Work Delay Start Finish Units Cost Baseline Cost Act. Cost Rem. Cost Research Associate 25% 20 hrs 0 days Mon 4/1/02 Fri 4/12/02 \$0 \$0 \$0 \$0

Notes

Labor:

This is to prepare masks for dummy sensors (1 metal mask)

Schedule:

work can start once the real prototype sensor layout is finished.

'	work c	can start once the real pro	ototype ser	isor layout	is finished.						
110	1 2				ummy Se	nooro: monul	octuring	¢ 40.7	' 50		
1.1.2.	1.2			D	running Se	ensors. manui	acturing	\$12,7	50		
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
•	2	FNALR&D	0%	0 hrs	0 days	Fri 4/12/02	Fri 4/12/02	\$8,500	\$0	\$0	\$8,500
	3	FNALCont	0%	0 hrs	0 days	Fri 4/12/02	Fri 4/12/02	\$4,250	\$0	\$0	\$4,250

Notes

These are metallised dummy sensors for bonding and mechanical tests.

We are also going to have real mechanicals (just silicon) which is diced at Fermilab.

based on quotation from different companies (C.Haber 1/25/2002):

- 1. 6" Silicon 50 wafers @ 30.00 each = \$1,500
- 2. 1 mask (metal) @ 2,500
- 3. processing is about \$65.00/wafer = \$3,250
- 4. dicing is about \$20.00/wafer = \$1,000
- 50 wafers should yield 50 detectors axials and 50 detectors stereo.

.1.3			Pro	totype Se	nsor Layout	\$22,36	69			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
6	Designer-SiDet	100%	320 hrs	0 days	Mon 2/4/02	Fri 3/29/02	\$12,205	\$0	\$0	\$12,205
8	Mech. Engineer-SiDet	75%	240 hrs	0 days	Mon 2/4/02	Fri 3/29/02	\$10,164	\$0	\$0	\$10,164
15	Scientist	20%	64 hrs	0 days	Mon 2/4/02	Fri 3/29/02	\$0	\$0	\$0	\$0

Labor:

most of the work is in the general mechanical layout of the sensors. Also lots of detailing is needed

WBS			Nam	ne			Cost				
1.1.2.1.4				Prototype	Sensors: sub	omission	\$0				
1.1.2.1.5					Sensor manuf		\$178.420)			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
3	FNALCont	0%	0 hrs	0 days	Fri 3/29/02	Fri 3/29/02	\$16,220	\$0	\$0	\$16,220	_
5	JapanEQ	0%	0 hrs	0 days	Fri 3/29/02	Fri 3/29/02	\$162,200	\$0	\$0	\$162,200	
Not	200										

Cost:

Based on quotation n. 03062002 from Hamamatsu (March 6 2002)

Prototype Sensors

Sensors	Type	Quantity	Unit Price	Total Price
	Grade "A"	30	\$792.00	\$23,760.00
Outer Axial	Grade "B"	30	\$475.00	\$14,250.00
	Material, NRE	1	\$43,000.00	\$43,000.00
	Grade "A"	30	\$792.00	\$23,760.00
Outer Stereo	Grade "B"	30	\$475.00	\$14,250.00
	Material, NRE	1	\$43,000.00	\$43,000.00
	\$162,200.00			

Outer

1.1

1.1.2.	1.6			Proto	type Sens	sors Available	\$()			
1.1.2.	1.7					al design work	\$3,388				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
<u>-</u>	8	Mech. Engineer-SiDet	50%	80 hrs	0 days	Wed 7/17/02	Tue 8/13/02	\$3,388	\$0	\$0	\$3,388
	15	Scientist	25%	40 hrs	0 days	Wed 7/17/02	Tue 8/13/02	\$0	\$0	\$0	\$0
	Note	26									

We are assuming that nothing should change in the design of the sensors. This re-work is scheduled only for very minor modifications if needed.

1.2.	1.8				Prototy	pe Sensor tests	\$8,8	80			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
•	2	FNALR&D	0%	0 hrs	0 days	Tue 7/16/02	Tue 7/16/02	\$4,000	\$0	\$0	\$4,000
	3	FNALCont	0%	0 hrs	0 days	Tue 7/16/02	Tue 7/16/02	\$2,000	\$0	\$0	\$2,000
	9	Elect. Technician	25%	120 hrs	0 days	Wed 7/17/02	Wed 10/9/02	\$2,880	\$0	\$0	\$2,880
	12	Research Associate	50%	240 hrs	0 days	Wed 7/17/02	Wed 10/9/02	\$0	\$0	\$0	\$0
	15	Scientist	25%	120 hrs	0 days	Wed 7/17/02	Wed 10/9/02	\$0	\$0	\$0	\$0

WBS Name Cost "Prototype Sensor tests" continued Notes Cost: This is to setup some radiation damage test (special boards), and tests at the probe station. All needed equipment already in hand for a small task such as this (we estimate of the order of 20 detectors to be tested at this stage at FNAL) Estimated from IIa \$100 each rad-test board (10 boards) \$500 box of needles for the probe station \$1,500 PC with labview controlling the probestation equipment. \$1,000 miscellanea cables and connectors. Total \$4,000 Labor: This is done mostly in Japan (Tsukuba and Okayama). Here we'll just verify some of the measurements and perform radiation damage tests. 1.1.2.1.9 Silicon Production Sensor ready to order Notes Schedule: We can order production silicon (also L0) after test of the prototype. 1.1.2.1.10 Production Sensors manufacturing Resource Name Units Work Delav Start Cost Baseline Cost Act. Cost Rem. Cost Finish JapanEQ 0% 0 hrs 0 davs Wed 10/9/02 Wed 10/9/02 \$0 \$0 \$0 \$0 Notes Schedule: Hamamatsu promised 200 detectors/month after a lag time of 4 months from receipt of order. 2,592 detectors/200/month = 13 + 4 month = 340 days We need to add 1 month for the L0 production (see "L0 sensor production") Total months 18 = 360 days 1.1.2.1.11 Axial sensor order (1st half) \$662,634 Act. Cost ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Rem. Cost **FNALEQ** 0% 0 hrs 0 days Wed 10/9/02 Wed 10/9/02 \$75.033 \$0 \$0 \$75.033 3 **FNALCont** 0% 0 hrs 0 days Wed 10/9/02 Wed 10/9/02 \$135,600 \$0 \$0 \$135,600 0% 0 days Wed 10/9/02 Wed 10/9/02 \$0 \$0 \$452,002 JapanEQ 0 hrs \$452,002 Notes

Cost:

Based on quotation n. 03062002 from Hamamatsu (March 6 2002)

1512 needed +20% spares = 1814 * \$460 + \$57,143 (masks + NRE +Silicon).

Total = 904,003 USD.

150,065 USD added for indirect costs (16.6%)

WBS				Nam	е		Co	ost			
"Axial sens	or orc	ler (1st half)" contir	nued								
	Note			•							
	split or	gency is 30% der in half to reflect Japa 1.5 + 75,032.5 indirect	nese fund	ing profile:							
1.1.2.1	1.12				Axial s	ensor order (2nd	d half) \$6	35,635			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	t Act. Co	st Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Mon 10/27/03	Mon 10/27/03	\$75,033			50 \$75,033
	3	FNALCont	0%	0 hrs	0 days	Mon 10/27/03	Mon 10/27/03	. ,			\$135,600
	5	JapanEQ	0%	0 hrs	0 days	Mon 10/27/03	Mon 10/27/03	\$425,002	\$0	9	50 \$425,002
	Note										
	order s	plit to better match Japa	nese fundi	ng profile							
1.1.2.1	1.13			Sma	all Angle	Stereo order (1s	t half) \$6	626,490			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Wed 10/9/02	Wed 10/9/02	\$70,940	\$0	\$0	
	3	FNALCont	0%	0 hrs	0 days	Wed 10/9/02	Wed 10/9/02	\$128,204	\$0	\$0	
	5	JapanEQ	0%	0 hrs	0 days	Wed 10/9/02	Wed 10/9/02	\$427,346	\$0	\$0	\$427,346
	Note	es									
	Cost:										
		on quotation n. 0306200 eded $+20\%$ spares = 776									
	Total =	427,346 USD		, , ,	naoko i ivi	LE TOMOGNY.					
		USD added for indirect gency is 30%	costs (16.	6%)							
		gency is 50%									
1.1.2.1	1.14			Sma	II Angle S	Stereo order (2nd	d half)	\$0			
	Note	es									
	order s	plit to better match Japa	nese fundi	ng profile							
1.1.2.1	l.15					Sensor T	esting	\$ 0			
	ID	Resource Name	Units	Woi	k De	lay Start	Finish	Cost Ba	aseline Cost A	ct. Cost	Rem. Cost
	16	NonFnal Labor	100%	2,880		ays Thu 2/13/		\$0	\$0	\$0	\$0
	Note	29									
		r includes Outer Avials (Outor SAS	and I O							

Testing includes Outer Axials, Outer SAS and L0 Schedule:

Testing will be done by the vendor (included in the sensors price).

WBS				Nam	е				Cost				
	stina"	' continued											
	Note												
	We will we will on the Cost: All equ Labor: Provide	Il receive 200 sensors/mo probe a sample (<-10%) quality and reliability of the sipment costs handled by) of the senso ne vendor mea	asureme	ents.	e prototype g	ave us confider	ce					
1.1.2.	1 16				Production	on Sensor	s Available		\$0				
1.1.2.					Production	n Sensors	s Complete		\$0				
1.1	.2.2						layer L0		\$145,680				
	Note												
		the small number of detect 144 for the project.	ctors needed	and the	use of the sa	ame technolo	gy as for the O	ıter sens	ors we order o	directly the production	n.		
1.1.2	2.2.1				L0 Sen	sor final c	lesign work		\$22,369				
	ID	Resource Name	U	Jnits	Work	Delay	Start		Finish				
	6	Designer-SiDet		00%	320 hrs	0 days	Tue 5/28/0		e 7/23/02				
	6 8	Mech. Engineer-	SiDet	75%	240 hrs	0 days	Tue 5/28/0	2 Tue	e 7/23/02				
	6		SiDet			0 days		2 Tue					
	6 8 15 ID	Mech. Engineer-Scientist Resource Name	SiDet :	75% 20% Jnits	240 hrs 64 hrs Cost	0 days	Tue 5/28/0 Tue 5/28/0 e Cost Act	2 Tue 2 Tue . Cost	e 7/23/02 e 7/23/02 Rem. Co				
	6 8 15 ID	Mech. Engineer-Scientist Resource Name Designer-SiDet	SiDet 2	75% 20% <u>Jnits</u> 00%	240 hrs 64 hrs Cost \$12,205	0 days 0 days	Tue 5/28/0. Tue 5/28/0. • Cost Act	2 Tue 2 Tue . Cost \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20	05			
	6 8 15 ID 6 8	Mech. Engineer-Scientist Resource Name Designer-SiDet Mech. Engineer-S	SiDet :	75% 20% <u>Jnits</u> 00% 75%	240 hrs 64 hrs Cost \$12,205 \$10,164	0 days 0 days	Tue 5/28/0 Tue 5/28/0 e Cost Act \$0 \$0	2 Tue 2 Tue . Cost \$0 \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20 \$10,10	05 64			
	6 8 15 ID	Mech. Engineer-Scientist Resource Name Designer-SiDet	SiDet :	75% 20% <u>Jnits</u> 00%	240 hrs 64 hrs Cost \$12,205	0 days 0 days	Tue 5/28/0. Tue 5/28/0. • Cost Act	2 Tue 2 Tue . Cost \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20 \$10,10	05			
	6 8 15 ID 6 8 15 Note	Mech. Engineer-S Scientist Resource Name Designer-SiDet Mech. Engineer-S Scientist	SiDet 2 10 SiDet	75% 20% Jnits 00% 75% 20%	240 hrs 64 hrs Cost \$12,205 \$10,164 \$0	0 days 0 days Baseline	Tue 5/28/0 Tue 5/28/0 e Cost Act \$0 \$0	2 Tue 2 Tue . Cost \$0 \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20 \$10,10	05 64			
	6 8 15 ID 6 8 15 Note This w Labor:	Mech. Engineer-S Scientist Resource Name Designer-SiDet Mech. Engineer-S Scientist es	SiDet U 10 SiDet	75% 20% Jnits 00% 75% 20%	240 hrs 64 hrs Cost \$12,205 \$10,164 \$0	0 days 0 days Baseline	Tue 5/28/0. Tue 5/28/0. e Cost Act \$0 \$0 \$0	2 Tue 2 Tue . Cost \$0 \$0 \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20 \$10,10	05 64			
	6 8 15 ID 6 8 15 Note This w Labor:	Mech. Engineer-S Scientist Resource Name Designer-SiDet Mech. Engineer-S Scientist	SiDet U 10 SiDet	75% 20% Jnits 00% 75% 20%	240 hrs 64 hrs Cost \$12,205 \$10,164 \$0	0 days 0 days Baseline	Tue 5/28/0. Tue 5/28/0. e Cost Act \$0 \$0 \$0	2 Tue 2 Tue . Cost \$0 \$0 \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20 \$10,10	05 64			
	6 8 15 ID 6 8 15 Note This w Labor: most o	Mech. Engineer-S Scientist Resource Name Designer-SiDet Mech. Engineer-S Scientist es	SiDet U 10 SiDet	75% 20% Jnits 00% 75% 20%	240 hrs 64 hrs Cost \$12,205 \$10,164 \$0 ag of the L0 s	0 days 0 days Baseline tructure.	Tue 5/28/0. Tue 5/28/0. E Cost Act \$0 \$0 \$0 \$0 \$f detailing is ne	2 Tue 2 Tue . Cost \$0 \$0 \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20 \$10,10	05 64			
1.1.2	6 8 15 ID 6 8 15 Note This w Labor: most o	Mech. Engineer-S Scientist Resource Name Designer-SiDet Mech. Engineer-S Scientist es	SiDet U 10 SiDet	75% 20% Jnits 00% 75% 20%	240 hrs 64 hrs Cost \$12,205 \$10,164 \$0 ng of the L0 s of the sensor	0 days 0 days Baseline tructure. s. Also lots of	Tue 5/28/0. Tue 5/28/0. E Cost Act \$0 \$0 \$0 f detailing is ne	2 Tue 2 Tue . Cost \$0 \$0 \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20 \$10,16	05 64			
	6 8 15 ID 6 8 15 Note This w Labor: most o	Mech. Engineer-Scientist Resource Name Designer-SiDet Mech. Engineer-Scientist es Pork is linked with the meches of the work is in the general	SiDet 10 11 SiDet 20 Chanical under	75% 20% Jnits 00% 75% 20% erstandin	240 hrs 64 hrs Cost \$12,205 \$10,164 \$0 ng of the L0 s of the sensor	0 days 0 days Baseline tructure. s. Also lots of	Tue 5/28/0. Tue 5/28/0. E Cost Act \$0 \$0 \$0 f detailing is newensor order Production	2 Tue 2 Tue . Cost \$0 \$0 \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20 \$10,16 \$0 \$123,311	05 64 \$0			
1.1.2	6 8 15 ID 6 8 15 Note This w Labor: most o	Mech. Engineer-S Scientist Resource Name Designer-SiDet Mech. Engineer-S Scientist es Fork is linked with the med of the work is in the general	SiDet 10 11 SiDet 2 chanical under al mechanica Units V	75% 20% Jnits 00% 75% 20% erstandin al layout of	240 hrs 64 hrs Cost \$12,205 \$10,164 \$0 and of the L0 s of the sensor L0 Pro L Delay	0 days 0 days Baseline tructure. s. Also lots of	Tue 5/28/0. Tue 5/28/0. E Cost Act \$0 \$0 \$0 f detailing is newensor order Production Fini	2 Tue 2 Tue . Cost \$0 \$0 \$0 \$0	\$0 \$123,311 Cost	05 64 \$0 Baseline Cost	Act. Cost	Rem. Cost	
1.1.2	6 8 15 ID 6 8 15 Note This w Labor: most o	Mech. Engineer-Scientist Resource Name Designer-SiDet Mech. Engineer-Scientist es Pork is linked with the meches of the work is in the general	SiDet U 10 SiDet Chanical unde al mechanica Units V 0% 0	75% 20% Jnits 00% 75% 20% erstandin	240 hrs 64 hrs Cost \$12,205 \$10,164 \$0 and of the L0 s of the sensor L0 Pro L Delay 0 days	0 days 0 days Baseline tructure. s. Also lots of	Tue 5/28/0. Tue 5/28/0. Tue 5/28/0. Se Cost Act \$0 \$0 \$0 f detailing is new ensor order Production Fini 03 Wed 5	2 Tue 2 Tue 5 Cost \$0 \$0 \$0 \$0 \$0 \$7 \$0	e 7/23/02 e 7/23/02 Rem. Co \$12,20 \$10,16 \$0 \$123,311	05 64 \$0	Act. Cost \$0 \$0	Rem. Cost \$13,963 \$25,234	

WBS				Nam	16			Cost				
)rodi	action" continued		INGII	16			COSt				
	ID ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
_	5	JapanEQ	0%	0 hrs	0 days	Wed 5/7/03	Wed 5/7/03	\$84,114	\$0	\$0	\$84,114	
	Note	es .										
11 W C B 14 To	e assost: ased 44 secotal 8 3,963	ectors needed. This is a sume here this "dedicate on quotation n. 0306200 nsors needed + 20% spa 1,114 USD. USD added for indirect gency is 30%	ed" month to 2 from Ha ares = 172	to be May 2 mamatsu (2*\$222 (35	2003. (March 6 200	02) 5,930 (Masks, NRI	E, Silicon)					
1.1.2.2	2.4					Sensor	Testing	\$0				
La	Note abor: ready	considered in the outer	sensors.	-								
1.1.2.2) 5					L0 Sensors A	vailahle	\$0				
1.1.2.2						L0 Sensors Co		\$0 \$0				
1.1.2.2			· · · · · · · · · · · · · · · · · · ·	:onstruc		odules, Staves		ەە \$2,217,229				
	.o Note	es		201131140	dioir or ivid	daics, Claves	dia Lo	ΨΖ,Ζ17,ΖΖΟ				
N	eed 1	80 staves, 1080 module ules for L0	s for the o	uter								
1.1.3	B.1			В	eginning	of Mechanical	Project	\$0				
	Note	es		_								
T	nis ta	sk marks the end of the	conceptua	l work and	the beginnir	ng of the specific re	ealization of mecha	nical parts.				
1.1.3	3.2					L0 Cons	struction	\$518,187				
	Note			<u>.</u>								
1.1.3.2		ed quantity for the L0 de	tector is 72	2 modules.								
	ı Note	95			Lu a	nalogue signa	ii cabies	\$329,330				
	. 1010	,,,		_								

These are Kapton cables which carry the analogue signals from the silicon to the input of the SVX4 chips.

We assume we will have 2 long (580mm), 2 medium (400mm) and 2 short (220mm) cables per sector (12*2 sectors in total).

Runs:

WBS Name Cost

"L0 analogue signal cables" continued

Notes

- 1. many small test run just to adjust the process
- 2. preproduction
- 3. production

Total cables needed = 144

\$41,616 1.1.3.2.1.1 L0 cables technology testing Start ID Resource Name Units Work Delav Finish Cost Baseline Cost Act. Cost Rem. Cost 2 FNALR&D 0% 0 days Mon 9/3/01 Mon 9/3/01 \$3,300 \$0 \$0 \$3,300 0 hrs \$0 \$0 3 FNALCont 0% 0 hrs 0 davs Mon 9/3/01 Mon 9/3/01 \$10,000 \$10,000 5 JapanEQ 0% 0 hrs 0 davs Mon 9/3/01 Mon 9/3/01 \$20,000 \$0 \$0 \$20,000 7 Elect. Engineer 5% 80 hrs 0 davs Mon 9/3/01 Fri 6/21/02 \$4.076 \$0 \$0 \$4.076 Elect. Technician 5% 80 hrs 0 days Mon 9/3/01 Fri 6/21/02 \$1,920 \$0 \$0 \$1,920 12 Research Associate 10% 160 hrs 0 days Mon 9/3/01 Fri 6/21/02 \$0 \$0 \$0 14 Wirebonder-SiDet 5% 80 hrs 0 days Mon 9/3/01 Fri 6/21/02 \$0 \$0 \$2,320 \$2.320 NonFnal Labor 400 hrs 0 days Mon 9/3/01 Fri 6/21/02 \$0 \$0 25% \$0 \$0

Notes

I ahor.

work done in Japan.

Estimated in 0.25 FTE (mostly keep contacts with the vendor and FNAL and some testing)

no FNAL labor except for minimum testing (wirebonding tests, electrical tests).

1.1.3.2.1.2 L0 Test cables Available \$0

Notes

These are the L00 design cables. They can be used for electrical test.

1.1.3.						ıction design	\$11,947				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	6	Designer-SiDet	75%	180 hrs	0 days	Mon 4/29/02	Mon 6/10/02	\$6,865	\$0	\$0	\$6,865
	8	Mech. Engineer-SiDet	50%	120 hrs	0 days	Mon 4/29/02	Mon 6/10/02	\$5,082	\$0	\$0	\$5,082
	12	Research Associate	25%	60 hrs	0 days	Mon 4/29/02	Mon 6/10/02	\$0	\$0	\$0	\$0

Notes

Labor:

the design will be done at FNAL.

These are multiple runs with very few cables (L00 style) each just to test the quality of the process.

This effor will determine the technology and vendor we will use for final fabrication.

This design goes in parallel with the CF support structure design.

The preproduction design should be also the final design for L0 cables.

WBS				Nam	e)	Cost			
1.1.3.2	2.1.4					production	fabrication		\$49,300			
	ID	Resource Name	Units	Work	Delay	Start	Finis	sh	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Mon 6/10	/02 Mon 6/1	0/02	\$19,700	\$0	\$0	\$19,700
	5	JapanEQ	0%	0 hrs	0 days	Mon 6/10	/02 Mon 6/1	0/02	\$29,600	\$0	\$0	\$29,600
	Note	es		_								
1.1.3.2	Prepro Type A Type E Type C Total = Added Added	on quote from KeyCom, duction quantity is 10 cal \(\therefore\): 1.080 MYen = 8.1K\\$ \(\therefore\): 1.536 MYen = 9.9K\\$ \(\therefore\): 1.536 MYen = 11.6K\\$ \(\therefore\): 29.6K\\$ 50% contingency 16.6% for indirect costs.	oles for ea) Preprodi	uction cabl	e available		\$0			
1.1.3.2							evaluation		\$4,014			
	ID	Resource Name		Units	Work	Delay	Start		Finish			
	8	Mech. Engineer-		25%	40 hrs	-	Thu 10/17/02		/ed 11/13/02			
	11	Mech. Technician		50%	80 hrs		Thu 10/17/02		/ed 11/13/02			
	12	Research Associa	ate	100%	160 hrs		Thu 10/17/02		/ed 11/13/02			
	16	NonFnal Labor		100%	160 hrs	•	Thu 10/17/02	2 VV	/ed 11/13/02			
	ID	Resource Name		Units	Cost	Baseline			Rem. Cost	_		
	8	Mech. Engineer-		25%	\$1,694		\$0	\$0	\$1,694			
	11	Mech. Technician		50%	\$2,320		\$ 0	\$0	\$2,320			
	12	Research Associa	ate	100%	\$0 \$0		\$0 \$0	\$0 ©0	\$0 \$0			
	16	NonFnal Labor		100%	\$0		\$0	\$0	\$0			
	proced Some	labor is for testing cables lures for cutting and hand electrical testing will be d tted to be 1 FTE	dling them.	-	cal and wireb	oonding) and e	establish					
1.1.3.2	2.1.7				L0 pro	oduction ca	able design		\$33,553			
	ID	Resource Name		Units	Work	Delay	Start		Finish	<u>-</u>		
	6	Designer-SiDet		100%	480 hrs	,	Thu 11/14/02		ed 2/19/03			
	8	Mech. Engineer-	SiDet	75%	360 hrs	0 days	Thu 11/14/02	. W	ed 2/19/03			

	ID	Resource Name		Units	Work	Delay	Start		Finish				
	12	Research Associa	ate	25%	120 hrs	0 days T	Γhu 11/14/	/02 We	ed 2/19/03				
	ID	Resource Name		Units	Cost	Baseline (Cost Ac	ct. Cost	Rem. Cost	_			
	6	Designer-SiDet	0:5	100%	\$18,307		\$0	\$0	\$18,307	_			
	8 12	Mech. Engineer- Research Associa		75% 25%	\$15,246 \$0		\$0 \$0	\$0 \$0	\$15,246 \$0				
			ate	25%	φО		Φυ	ΦО	ΦО				
	Note												
	we ass	sume some minor modific	ations nee	eded to the	mecahnics of	of the cable desi	ign.						
	This is	all FNAL labor											
1.1.3.	2.1.8					L0 cable p	roduction	۱ ۹	\$188,900				
	ID	Resource Name	Units	Work	Delay	Start	F	inish	Cost	Baseline Co	st Act	. Cost	Rem. Cost
			00/	0 hrs	0 days	Wed 2/19/0	03 Wed	2/19/03	\$18,900		\$O	\$0	\$18,900
	1	FNALEQ	0%										
	3	FNALCont	0%	0 hrs	0 days	Wed 2/19/0	03 Wed	2/19/03	\$56,000	;	\$O	\$0	\$56,000
	-						03 Wed	l 2/19/03 l 2/19/03		;		\$0 \$0	\$56,000 \$114,000
	3 5 Note	FNALCont JapanEQ es	0% 0%	0 hrs 0 hrs	0 days 0 days	Wed 2/19/0 Wed 2/19/0	03 Wed		\$56,000	;	\$O		
	3 5 Note 6 types	FNALCont JapanEQ	0% 0%	0 hrs 0 hrs	0 days 0 days	Wed 2/19/0 Wed 2/19/0	03 Wed		\$56,000	;	\$O		
	3 5 Note 6 types Cost: Based	FNALCont JapanEQ es s of cables, 3 lengths, 48 on quote from KeyCom,	0% 0% of each le	0 hrs 0 hrs	0 days 0 days e whole dete	Wed 2/19/0 Wed 2/19/0	03 Wed 03 Wed	I 2/19/03	\$56,000	;	\$O		
	3 5 Note 6 types Cost: Based type A:	FNALCont JapanEQ es s of cables, 3 lengths, 48 on quote from KeyCom, : 456k NRE + 62.4k yen/	0% 0% of each le Japan. cable = 4.2	0 hrs 0 hrs ngth for th 2Myen=\$3	0 days 0 days e whole dete	Wed 2/19/0 Wed 2/19/0 ctor m long, 48 neede	03 Wed 03 Wed ded, 60 order	1 2/19/03 red]	\$56,000	;	\$O		
	Note 6 types Cost: Based type A: type B: typeC:	FNALCont JapanEQ es s of cables, 3 lengths, 48 on quote from KeyCom, : 456k NRE + 62.4k yen/c : 588k NRE + 72.6kyen/c 636k NRE + 90.0kyen/c	0% 0% of each le Japan. cable = 4.2 able = 6.04	0 hrs 0 hrs ngth for th 2Myen=\$33 Myen=\$44Myen=\$44	0 days 0 days e whole dete- 1,668 [220mr 5,946 [400m	Wed 2/19/0 Wed 2/19/0 ctor m long, 48 needs m long, 48 needs	03 Wed 03 Wed led, 60 order ded, 60 order	1 2/19/03 red]	\$56,000	;	\$O		
	Note 6 types Cost: Based type A: type B: typeC: exchar	FNALCont JapanEQ es s of cables, 3 lengths, 48 on quote from KeyCom, : 456k NRE + 62.4k yen/c : 588k NRE + 72.6kyen/c 636k NRE + 90.0kyen/c nge rate considered is 0.0	0% 0% of each le Japan. cable = 4.2 able = 6.04	0 hrs 0 hrs ngth for th 2Myen=\$33 Myen=\$44Myen=\$44	0 days 0 days e whole dete- 1,668 [220mr 5,946 [400m	Wed 2/19/0 Wed 2/19/0 ctor m long, 48 needs m long, 48 needs	03 Wed 03 Wed led, 60 order ded, 60 order	1 2/19/03 red]	\$56,000	;	\$O		
	3 5 Note 6 types Cost: Based type A: type B: typeC: exchar Total is	FNALCont JapanEQ es s of cables, 3 lengths, 48 on quote from KeyCom, : 456k NRE + 62.4k yen/: : 588k NRE + 72.6kyen/c 636k NRE + 90.0kyen/c nge rate considered is 0.0 s = 114,156 \$	0% 0% of each le Japan. cable = 4.2 able = 6.04 00754 USI	0 hrs 0 hrs ngth for th 2Myen=\$33 Myen=\$44Myen=\$44	0 days 0 days e whole dete- 1,668 [220mr 5,946 [400m	Wed 2/19/0 Wed 2/19/0 ctor m long, 48 needs m long, 48 needs	03 Wed 03 Wed led, 60 order ded, 60 order	1 2/19/03 red]	\$56,000	;	\$O		
	3 5 Note 6 types Cost: Based type A: type B: typeC: exchar Total is	FNALCont JapanEQ es s of cables, 3 lengths, 48 on quote from KeyCom, : 456k NRE + 62.4k yen/c : 588k NRE + 72.6kyen/c 636k NRE + 90.0kyen/c nge rate considered is 0.0	0% 0% of each le Japan. cable = 4.2 able = 6.04 00754 USI	0 hrs 0 hrs ngth for th 2Myen=\$33 Myen=\$44Myen=\$44	0 days 0 days e whole dete- 1,668 [220mr 5,946 [400m	Wed 2/19/0 Wed 2/19/0 ctor m long, 48 needs m long, 48 needs	03 Wed 03 Wed led, 60 order ded, 60 order	1 2/19/03 red]	\$56,000	;	\$O		
1.1.3.	3 5 Note 6 types Cost: Based type A: type B: typeC: exchar Total is	FNALCont JapanEQ es s of cables, 3 lengths, 48 on quote from KeyCom, : 456k NRE + 62.4k yen/: : 588k NRE + 72.6kyen/c 636k NRE + 90.0kyen/c nge rate considered is 0.0 s = 114,156 \$	0% 0% of each le Japan. cable = 4.2 able = 6.04 00754 USI	0 hrs 0 hrs ngth for th 2Myen=\$33 Myen=\$44Myen=\$44	0 days 0 days e whole deter 1,668 [220mi 5,946 [400m 5,542 [580m	Wed 2/19/0 Wed 2/19/0 ctor m long, 48 needs m long, 48 needs	03 Wed 03 Wed ded, 60 order ded, 60 order eded, 60 order	red] ered] ered]	\$56,000	;	\$O		
1.1.3.	3 5 Note 6 types Cost: Based type A: type B: typeC: exchar Total is	FNALCont JapanEQ es s of cables, 3 lengths, 48 on quote from KeyCom, : 456k NRE + 62.4k yen/: : 588k NRE + 72.6kyen/c 636k NRE + 90.0kyen/c nge rate considered is 0.0 s = 114,156 \$	0% 0% of each le Japan. cable = 4.2 able = 6.04 00754 USI	0 hrs 0 hrs ngth for th 2Myen=\$33 Myen=\$44Myen=\$44	0 days 0 days e whole deter 1,668 [220mi 6,946 [400m 5,542 [580m	Wed 2/19/0 Wed 2/19/0 ctor m long, 48 needem l	03 Wed 03 Wed ded, 60 order ded, 60 order eded, 60 order	red] ered] ered]	\$56,000 \$114,000 \$0	;	\$O	\$0	
1.1.3.	3 5 Note 6 types Cost: Based type A: type B: typeC: exchar Total is \$18.9k	FNALCont JapanEQ es of cables, 3 lengths, 48 on quote from KeyCom, : 456k NRE + 62.4k yen/c : 588k NRE + 72.6kyen/c 636k NRE + 90.0kyen/c nge rate considered is 0.0 s = 114,156 \$ C added for indirect costs	0% 0% of each led Japan. cable = 4.2 able = 6.04 00754 USI (16.6%)	0 hrs 0 hrs ngth for th 2Myen=\$3: Myen=\$4: D/Yen	0 days 0 days e whole deter 1,668 [220mi 5,946 [400m 5,542 [580m	Wed 2/19/0 Wed 2/19/0 ctor m long, 48 need m long, 48 need nm long, 48 need cable Product ay Sta	03 Wed 03 Wed ded, 60 ordereded, 60 ordereded, 60 ordereded, 60 ordereded, 61 ordereded, 62 ordereded, 63 ordereded, 63 ordereded, 63 ordereded, 64 ordereded, 65 orderede	red] ered] ered]	\$56,000 \$114,000 \$0 Cost Ba		Act. Co	\$0	\$114,000
1.1.3.	3 5 Note 6 types Cost: Based type A: type B: typeC: exchar Total is \$18.9k	FNALCont JapanEQ es s of cables, 3 lengths, 48 on quote from KeyCom, : 456k NRE + 62.4k yen/c : 588k NRE + 72.6kyen/c : 636k NRE + 90.0kyen/c : nge rate considered is 0.0 s = 114,156 \$ C added for indirect costs Resource Name NonFnal Labor	of each led Japan. cable = 4.2 able = 6.0 10754 USI (16.6%)	0 hrs 0 hrs 1 hrs 2 Myen=\$33 Myen=\$44 Myen=\$44 D/Yen	0 days 0 days e whole deter 1,668 [220mi 5,946 [400m 5,542 [580m	Wed 2/19/0 Wed 2/19/0 ctor m long, 48 need m long, 48 need nm long, 48 need cable Product ay Sta	03 Wed 03 Wed ded, 60 ordereded, 60 ordereded, 60 ordereded, 60 ordereded, 61 ordereded, 62 ordereded, 63 ordereded, 63 ordereded, 63 ordereded, 64 ordereded, 65 orderede	red] ered] ered] ered] t Finish	\$56,000 \$114,000 \$0 Cost Ba	aseline Cost	Act. Co	\$0 st Re	\$114,000

WDO										01					
WBS				Nan	ne					Cost					
1.1.3.2.						L0 cable				\$0					
1.1.3	3.2.2					laye	r 0 mo	dules		\$188,856					
	Note	es are formed by 2 sensor	re alued "	hood on"	a pair of Kap	ton cables (s	naloguo	cable) and	ono 2	chine I O hybr	id				
		72 for the project.	ns glueu	neau-on,	a pail oi Napi	ion cables (a	ii iaiogu e	cable) allu	OHE Z	-criips Lo riybi	iu.				
1.1.3.2	2.2.1				L0 module	s R&D ar	nd Prote	otype		\$25,757					
	ID	Resource Name		Units	Work	Delay		art		Finish					
	6	Designer-SiDet		50%	320 hrs	0 days		//25/02		11/14/02					
	8	Mech. Engineer-		50%	320 hrs	0 days		//25/02		11/14/02					
	12	Research Associa	ate	50%	320 hrs	0 days	Thu 7	/25/02	Thu	11/14/02					
	ID	Resource Name		Units	Cost	Baselin		Act. C	ost	Rem. Cos	st				
	6	Designer-SiDet		50%	\$12,205		\$0		\$0	\$12,20					
	8	Mech. Engineer-		50%	\$13,552		\$0		\$0	\$13,55					
	12	Research Associa	ate	50%	\$0		\$0		\$0	\$	0				
	Note	es		_											
	Genera	al: ork is to establish wheth	or tha I O a	olootrical a	oncont is sou	nd									
		I use some hybrid (outer					ensors).								
1.1.3.2	2.2.2				L0 m	odule: fix	tures d	esign		\$16,777					
	ID	Resource Name		Units	Work	Delay	S	Start		Finish	Cost	Basel	ine Cost	Act. Cost	Rem. Cost
	6	Designer-SiDet		100%	240 hrs	0 days	Wed	7/24/02	W	ed 9/4/02	\$9,154		\$0	\$0	\$9,154
	8	Mech. Engineer-	SiDet	75%	180 hrs	0 days	Wed	7/24/02	W	ed 9/4/02	\$7,623		\$0	\$0	\$7,623
	Note	es		=											
	Labor:	d to modify the old L00 fi	vturoc												
		a to modify the old Loo h	xiui es		0		! 6 :			\$ 00,000					
1.1.3.2					.0 module:					\$30,000	.	•			
	ID	Resource Name	Units	Work	Delay	Start		Finish		Cost	Baseline		Act. Cos		
	1	FNALEQ	0%	0 hrs	0 days	Wed 9/4		Ned 9/4/		\$20,000		\$0 \$0	\$0		
	3	FNALCont	0%	0 hrs	0 days	Wed 9/4	1/02 V	Wed 9/4/	02	\$10,000		\$0	\$(\$10,0	00
	Note	es		_											

Schedule:

we need to have fixtures ready when sensors, hybrids and signal cables for L0 are ready

Cost:

based on Engineering Estimate

WBS	Name	Cost	

"L0 module: material and fixtures" continued

Notes

- 1. 2 fixtures for sensor to sensor and cable gluing at 7.5K/fixture =15k
- 2. 5k for misc. stuff. (material and other small fixtures)

1.1.3.2.	2.4		L0 prepr	roduction r	nodule co	nstruction	\$9,11	8			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
•	8	Mech. Engineer-SiDet	25%	40 hrs	0 days	Mon 7/7/03	Fri 8/1/03	\$1,694	\$0	\$0	\$1,694
	11	Mech. Technician-SiDet	150%	240 hrs	0 days	Mon 7/7/03	Fri 8/1/03	\$6,960	\$0	\$0	\$6,960
	12	Research Associate	50%	80 hrs	0 days	Mon 7/7/03	Fri 8/1/03	\$0	\$0	\$0	\$0
	13	CMM Programmer-SiDet	10%	16 hrs	0 days	Mon 7/7/03	Fri 8/1/03	\$464	\$0	\$0	\$464

Notes

Schedule:

This is done with Preproduction L0 hybrids, Preproduction cables and Production detectors.

Represents the FIRST milestone for the L0 project.

We will make 6 modules to test the final concept.

Labor:

- 1. mech. tech. (150%) gluing sensors and cables
- 2. CMM prog. (10%) for setting up program at the CMM to identify sensor fiducials
- 3. mech engineer (25%) support
- 4. Research Associate (50%) support

2.5							\$ 0			
2.6										
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
9	Elect. Technician	25%	120 hrs	0 days	Mon 8/4/03	Mon 10/27/03	\$2,880	\$0	\$0	\$2,880
12	Research Associate	150%	720 hrs	0 days	Mon 8/4/03	Mon 10/27/03	\$0	\$0	\$0	\$0
15	Scientist	25%	120 hrs	0 days	Mon 8/4/03	Mon 10/27/03	\$0	\$0	\$0	\$0
	2.6 ID 9 12	2.6 ID Resource Name 9 Elect. Technician 12 Research Associate	2.6 L0 ID Resource Name Units 9 Elect. Technician 25% 12 Research Associate 150%	2.6 L0 preproduction ID Resource Name Units Work 9 Elect. Technician 25% 120 hrs 12 Research Associate 150% 720 hrs	2.6 L0 preproduction mod ID Resource Name Units Work Delay 9 Elect. Technician 25% 120 hrs 0 days 12 Research Associate 150% 720 hrs 0 days	2.6 L0 preproduction modules evaluation ID Resource Name Units Work Delay Start 9 Elect. Technician 25% 120 hrs 0 days Mon 8/4/03 12 Research Associate 150% 720 hrs 0 days Mon 8/4/03	2.6 L0 preproduction modules evaluation \$2,8 ID Resource Name Units Work Delay Start Finish 9 Elect. Technician 25% 120 hrs 0 days Mon 8/4/03 Mon 10/27/03 12 Research Associate 150% 720 hrs 0 days Mon 8/4/03 Mon 10/27/03	2.6 L0 preproduction modules evaluation \$2,880 ID Resource Name Units Work Delay Start Finish Cost 9 Elect. Technician 25% 120 hrs 0 days Mon 8/4/03 Mon 10/27/03 \$2,880 12 Research Associate 150% 720 hrs 0 days Mon 8/4/03 Mon 10/27/03 \$0	2.6 L0 preproduction modules evaluation \$2,880 ID Resource Name Units Work Delay Start Finish Cost Baseline Cost 9 Elect. Technician 25% 120 hrs 0 days Mon 8/4/03 Mon 10/27/03 \$2,880 \$0 12 Research Associate 150% 720 hrs 0 days Mon 8/4/03 Mon 10/27/03 \$0 \$0	2.6 L0 preproduction modules evaluation \$2,880 ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost 9 Elect. Technician 25% 120 hrs 0 days Mon 8/4/03 Mon 10/27/03 \$2,880 \$0 \$0 12 Research Associate 150% 720 hrs 0 days Mon 8/4/03 Mon 10/27/03 \$0 \$0 \$0

Notes

This is the important test for L0, establishing that everything is working properly and that we can proceed to the production phase. Labor:

- 1. Research associate (150%) electrical test
- 2. Elect. Technician (25%) support
- 3. Scientist (25%) support

1.1.3.2.2.7 Milestone#2: L0 preproduction module ready \$0

WBS			Nan	ne					Cost	
1.1.3.2.2	2.8		Produ	uction L0 m	nodule: fix	kture de	sign		\$17,029	
	ID	Resource Name	Units	Work	Delay	St	art		Finish	
_	6	Designer-SiDet	75%	180 hrs	0 days	Tue 10	0/28/03	W	ed 12/10/03	
	8	Mech. Engineer-SiDet	100%	240 hrs	0 days	Tue 10	0/28/03	W	ed 12/10/03	
_	ID	Resource Name	Units	Cost	Baselin	e Cost	Act. C	ost	Rem. Cost	
	6	Designer-SiDet	75%	\$6,865		\$0		\$0	\$6,865	
	8	Mech. Engineer-SiDet	100%	\$10,164		\$0		\$0	\$10,164	
	Note	es								

This is to possibly modify the preproduction fixtures.

This is a contingency task.

1.1.3.2.	2.9		Prod	uction L	0 module	: material and fix	tures \$7	2,000			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
-	1	FNALEQ	0%	0 hrs	0 days	Wed 12/10/03	Wed 12/10/03	\$48,000	\$0	\$0	\$48,000
	3	FNALCont	0%	0 hrs	0 days	Wed 12/10/03	Wed 12/10/03	\$24,000	\$0	\$0	\$24,000

Notes

Cost

We need 2 sets of fixtures + 1 spare.

Based on Engineering Estimate.

A set of fixture include detector to detector gluing, cable to detector gluing, cable to cable alignment, cable to hybrid gluing, cable cutting.

Cost of each set is ~16K.

Total cost is 48K\$

1.1.3.2.2.10			L0	Module p	oroducti	on	:::::::::::::::::::::::::::::::::::::::	\$15,296
ID	Resource Name	Units	Work	Delay	Sta	art		Finish
8	Mech. Engineer-SiDet	25%	90 hrs	0 days	Thu 2/	19/04	We	d 4/21/04
11	Mech. Technician-SiDet	100%	360 hrs	0 days	Thu 2/	19/04	We	d 4/21/04
12	Research Associate	50%	180 hrs	0 days	Thu 2/	19/04	We	d 4/21/04
13	CMM Programmer-SiDet	10%	36 hrs	0 days	Thu 2/	19/04	We	d 4/21/04
ID	Resource Name	Units	Cost	Baselin	e Cost	Act.	Cost	Rem. Cost
8	Mech. Engineer-SiDet	25%	\$3,812		\$0		\$0	\$3,812
11	Mech. Technician-SiDet	100%	\$10,440		\$0		\$0	\$10,440
12	Research Associate	50%	\$0		\$0		\$0	\$0
13	CMM Programmer-SiDet	10%	\$1.044		\$0		\$0	\$1.044

WBS			Nam	ıe			(Cost	
"I 0 Module i	nrod	uction" continued							
Lo Modulo	Note								
-	Sched	ıle:	-						
	Ve as .abor:	sume a rate of 2 L0 modules a day	=> ~45 da	ys (need 72 r	nodules, we	'll build ~90)			
0	ne ful	I time technician needed.							
Α	All othe	er personnel are for support.							
1.1.3.2.2.	.11		LC) Productio	n Module	es Available		\$0	
1.1.3.2.2.						s Complete		\$0	
1.1.3.2.2.	. ı∠ Note	00	LO	Fioductio	ii wodule	s Complete		φυ	
7		dules for the whole detector. Assur	ne we can	make 4/dav =	= 25 davs fo	r 100 modules			
								A	
1.1.3					Outer lay	er modules		\$530,439	
	Note		ood on" O	n ton of one o	oncor ono h	whrid and and nitch	adant	or is also alued M	Module is wirebonded and put on a G-10 frame for testing.
		82 modules for the project.	sau-on . O	ii top or one s	ensor one i	lybrid and one pitch	auapi	er is also glued. Iv	nodule is wirebonded and put on a G-10 frame for testing.
1.1.3.	3.1		Pro	ototype Mo	odule: fixt	ures design		\$44,330	
	ID	Resource Name	Units	Work	Delay	Start		Finish	
_	6	Designer-SiDet	75%	360 hrs	0 days	Wed 1/30/02		e 4/23/02	
	7	Elect. Engineer	25%	120 hrs	0 days	Wed 1/30/02		e 4/23/02	
	8	Mech. Engineer-SiDet Elect. Technician	75% 50%	360 hrs 240 hrs	0 days	Wed 1/30/02 Wed 1/30/02		e 4/23/02 e 4/23/02	
	9 11	Mech. Technician-SiDet	25%	120 hrs	0 days 0 days	Wed 1/30/02 Wed 1/30/02		e 4/23/02 e 4/23/02	
	12	Research Associate	50%	240 hrs	0 days	Wed 1/30/02		e 4/23/02	
	ID	Resource Name	Units	Cost	•	e Cost Act. C		Rem. Cost	
-	6	Designer-SiDet	75%	\$13,730		\$0	\$0	\$13,730	-
	7	Elect. Engineer	25%	\$6,114		\$0	\$0	\$6,114	
	8	Mech. Engineer-SiDet	75%	\$15,246		\$0	\$0	\$15,246	
	9	Elect. Technician	50%	\$5,760		\$0 \$0	\$0 \$0	\$5,760	
	11 12	Mech. Technician-SiDet Research Associate	25% 50%	\$3,480 \$0		\$0 \$0	\$0 \$0	\$3,480 \$0	
	12	Nesealth Associate	JU 70	φυ		φυ	ΦU	ΦΟ	

Labor:

Notes

This is for fixture designing and also to get all other support material in place for prototype module construction (support are: boxes, storage, designing G-10 frames for holding/testing modules, programming the CMM machines etc.)

WBS				Nam	ie			Cost				
1.1.3	.3.2			Prototyp	e Module	: material and t	fixtures	\$33,750				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	2	FNALR&D	0%	0 hrs	0 days	Tue 4/23/02	Tue 4/23/02	\$22,500	\$0	\$0	\$22,500	
	3	FNAL Cont	0%	0 hrs	0 davs	Tue 4/23/02	Tue 4/23/02	\$11,250	\$0	\$0	\$11,250	

Notes

Schedule:

These are the fixtures for prototype module construction in summer 2002.

- 1. detector/detector alignment fixtures (5K each)
- 2. hybrid/pitch adapter gluing fixture (3k each)
- 3. wirebonding fixture (2k each)
- 4. testing mechanical setup (2k each) [*2]
- 5. G-10 frames (0.025k each) [*180]
- 6. miscellanea material 4k

1.1.3.	3.3		P	rototype M	odule: As	sembling		\$37,975
	ID	Resource Name	Units	Work	Delay	Start		Finish
<u>-</u>	6	Designer-SiDet	20%	96 hrs	0 days	Thu 7/25/02	Thu	10/17/02
	8	Mech. Engineer-SiDet	25%	120 hrs	0 days	Thu 7/25/02	Thu	10/17/02
	11	Mech. Technician-SiDet	150%	720 hrs	0 days	Thu 7/25/02	Thu	10/17/02
	12	Research Associate	75%	360 hrs	0 days	Thu 7/25/02	Thu	10/17/02
	13	CMM Programmer-SiDet	10%	48 hrs	0 days	Thu 7/25/02	Thu	10/17/02
	14	Wirebonder-SiDet	50%	240 hrs	0 days	Thu 7/25/02	Thu	10/17/02
	15	Scientist	25%	120 hrs	0 days	Thu 7/25/02	Thu	10/17/02
	ID	Resource Name	Units	Cost	Baselin	e Cost Act.	Cost	Rem. Cost
<u>-</u>	6	Designer-SiDet	20%	\$3,661		\$0	\$0	\$3,661
	8	Mech. Engineer-SiDet	25%	\$5,082		\$0	\$0	\$5,082
	11	Mech. Technician-SiDet	150%	\$20,880		\$0	\$0	\$20,880
	12	Research Associate	75%	\$0		\$0	\$0	\$0
	13	CMM Programmer-SiDet	10%	\$1,392		\$0	\$0	\$1,392
	14	Wirebonder-SiDet	50%	\$6,960		\$0	\$0	\$6,960
	15	Scientist	25%	\$0		\$0	\$0	\$0

Notes

Schedule:

 $30\ \text{modules}$ to be built. We assume 0.5 modules/day for the prototypes.

1. postdoc (75%) support

- 2. mech. technician (100%) gluing/aligning
- 3. wirebonder (50%)

			Nam '	- -			Cost				
rototype N		e: Assembling " continued	l								
=	Notes		<u>-</u>								
5	5. mech.	technician (50%) for miscellane engineer (25%) support man (20%) for miscellanea boxes			to fixtures e	ato					
		ist (25%) support	s, storage,	mounications	to lixtures e	ж.					
440				D1-1-				Ф О			
1.1.3.	3.4			Prototy	oe modul	es available		\$0			
1.1.3.	3.5		Co	ntingency	Module: A	Assembling		\$0			
	Notes	3									
5	Schedule	9:									
3	30 modu	e: les to be build and tested (5 stav	es). We as	ssume 0.5 mc	dules/day fo	or the prototypes					
3 L	30 modu _abor:	les to be build and tested (5 stav	,		•	, ,,					
3 L N	30 modu ₋abor: No labor		,		•	, ,,					
3 L N J	30 modu ₋abor: No labor Iust a sh	les to be build and tested (5 stav since if we are here means that	we did not	use the proto	type assemb	oling labor.					
3 L N	30 modu ₋abor: No labor Iust a sh	les to be build and tested (5 stav since if we are here means that	we did not	use the proto	type assemb	, ,,		\$0			
3 L N J	80 modu Labor: No labor Just a sh 3.6	les to be build and tested (5 stav since if we are here means that	we did not	use the proto	type assemb	oling labor.					
1.1.3.	30 modu Labor: No labor Just a sh 3.6	les to be build and tested (5 stav since if we are here means that	we did not	use the proto	type assemb	oling labor.			Baseline Cost	Act. Cost	Rem. Cos
1.1.3.	30 modu Labor: No labor Just a sh 3.6 3.7	les to be build and tested (5 stav since if we are here means that lift in the schedule.	we did not Prepro	use the proto Contingent duction Mo	type assemb cy modulo odule: fixt	oling labor. es available tures design	\$22,10	65	Baseline Cost \$0	Act. Cost	Rem. Cos \$6,86
1.1.3.	30 modu Labor: No labor Just a sh 3.6 3.7 ID	les to be build and tested (5 stav since if we are here means that iff in the schedule.	we did not Prepro Units	use the proto Contingenduction Mo Work	type assemb cy modulo odule: fixt Delay	oling labor. es available tures design Start	\$22,10 Finish	65 Cost			\$6,86
1.1.3.	30 modu .abor: No labor Just a sh 3.6 3.7 ID 6 7	les to be build and tested (5 stav since if we are here means that lift in the schedule. Resource Name Designer-SiDet	we did not Prepro Units 75%	Contingenduction Mowerland Work 180 hrs	type assemb cy modul odule: fixt Delay 0 days	es available tures design Start Fri 3/7/03	\$22,10 Finish Thu 4/17/03	65 Cost \$6,865	\$0	\$0	
1.1.3.	30 modu .abor: No labor Just a sh 3.6 3.7 ID 6 7	les to be build and tested (5 stav since if we are here means that lift in the schedule. Resource Name Designer-SiDet Elect. Engineer	Prepro Units 75% 25%	Contingenduction Mork 180 hrs 60 hrs	cy moduloule: fixto Delay 0 days 0 days	es available tures design Start Fri 3/7/03 Fri 3/7/03	\$22,10 Finish Thu 4/17/03 Thu 4/17/03	65 Cost \$6,865 \$3,057	\$0 \$0	\$0 \$0	\$6,865 \$3,057
1.1.3.	30 modu Labor: No labor Just a sh 3.6 3.7 ID 6 7 8 9	les to be build and tested (5 staves since if we are here means that wift in the schedule. Resource Name Designer-SiDet Elect. Engineer Mech. Engineer-SiDet	Prepro Units 75% 25% 75%	Contingenduction Mowerland Work 180 hrs 60 hrs 180 hrs	cy module: fixto Delay 0 days 0 days 0 days	es available tures design Start Fri 3/7/03 Fri 3/7/03 Fri 3/7/03	\$22,10 Finish Thu 4/17/03 Thu 4/17/03 Thu 4/17/03	65 Cost \$6,865 \$3,057 \$7,623	\$0 \$0 \$0	\$0 \$0 \$0	\$6,865 \$3,057 \$7,623
1.1.3.	30 modu Labor: No labor Just a sh 3.6 3.7 ID 6 7 8 9	Resource Name Designer-SiDet Elect. Engineer-SiDet Elect. Technician	Prepro Units 75% 25% 75% 50%	Contingenduction Mowerland Work 180 hrs 60 hrs 180 hrs 180 hrs	cy module: fixto Delay 0 days 0 days 0 days 0 days 0 days	es available tures design Start Fri 3/7/03 Fri 3/7/03 Fri 3/7/03	\$22,10 Finish Thu 4/17/03 Thu 4/17/03 Thu 4/17/03 Thu 4/17/03	65 Cost \$6,865 \$3,057 \$7,623 \$2,880	\$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0	\$6,869 \$3,05 \$7,623 \$2,880

Labor:

- Mech engineer (75%) fixtures and supervision
 Draftsman (75%) support for mech. engineer

- Draitsman (75%) support of mech. engineer
 postdoc (50%) support
 mech. technician (25%) support
 Elect. Engineer (25%) designing test boards
 Elect. technician (25%) support

1.1.3.3.8		Prep	roductio	n Module	: material and f	fixtures	\$57,750					
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost		
2	FNALR&D	0%	0 hrs	0 days	Thu 4/17/03	Thu 4/17/03	\$38,500	\$0	\$0	\$38,500		
3	FNALCont	0%	0 hrs	0 days	Thu 4/17/03	Thu 4/17/03	\$19,250	\$0	\$0	\$19,250		

WBS Name Cost

"Preproduction Module: material and fixtures" continued

Notes

Schedule:

These are the fixtures for production of the module construction.

We assume that we can align 6 silicon pairs on a single fixture/day and 1 hybrid/pitch-adapter per day. In preproduction we assume we manufacture the FINAL production fixtures just in a smaller quantity than needed to sustain the final production rate.

Cost

1.1

We assume to have to remake all fixtures used for the prototype phase.

- 1. fixtures for detector-detector (5k each) [*2]
- 2. fixture for hybrid/pitch to detector (3k each) [*4]
- 3. fixture for wirebonding modules (2k each) [*2]
- 4. testing mechanical setup (2k each) [*2]
- 5. G-10 frames (0.025k each) [*180]
- 6. miscellanea materials, boxes, storage cabinets (4K total)

3.9		Prepr	oduction mo	odule: Ass	sembli	ng	\$8	80,390
ID	Resource Name	Units	Work	Delay	5	Start		Finish
8	Mech. Engineer-SiDet	25%	200 hrs	0 days	Tue	8/19/03	Thu	u 1/22/04
11	Mech. Technician-SiDet	200%	1,600 hrs	0 days	Tue	8/19/03	Thu	u 1/22/04
12	Research Associate	75%	600 hrs	0 days	Tue	8/19/03	Thu	u 1/22/04
13	CMM Programmer-SiDet	10%	80 hrs	0 days	Tue	8/19/03	Thu	u 1/22/04
14	Wirebonder-SiDet	100%	800 hrs	0 days	Tue	8/19/03	Thu	u 1/22/04
ID	Resource Name	Units	Cost	Baseline	Cost	Act. Co	st	Rem. Cost
8	Mech. Engineer-SiDet	25%	\$8,470		\$0	9	04	\$8,470
11	Mech. Technician-SiDet	200%	\$46,400		\$0	9	60	\$46,400
12	Research Associate	75%	\$0		\$0	9	60	\$0
13	CMM Programmer-SiDet	10%	\$2,320		\$0	9	60	\$2,320
14	Wirebonder-SiDet	100%	\$23,200		\$0	9	60	\$23,200
	8 11 12 13 14 ID 8 11 12 13	B Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate CMM Programmer-SiDet Wirebonder-SiDet Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate CMM Programmer-SiDet CMM Programmer-SiDet	B Mech. Engineer-SiDet 25% 11 Mech. Technician-SiDet 200% 12 Research Associate 75% 13 CMM Programmer-SiDet 10% 14 Wirebonder-SiDet 100% ID Resource Name Units B Mech. Engineer-SiDet 25% 11 Mech. Technician-SiDet 200% 12 Research Associate 75% 13 CMM Programmer-SiDet 10%	ID Resource Name Units Work 8 Mech. Engineer-SiDet 25% 200 hrs 11 Mech. Technician-SiDet 200% 1,600 hrs 12 Research Associate 75% 600 hrs 13 CMM Programmer-SiDet 10% 80 hrs 14 Wirebonder-SiDet 100% 800 hrs ID Resource Name Units Cost 8 Mech. Engineer-SiDet 25% \$8,470 11 Mech. Technician-SiDet 200% \$46,400 12 Research Associate 75% \$0 13 CMM Programmer-SiDet 10% \$2,320	ID Resource Name Units Work Delay 8 Mech. Engineer-SiDet 25% 200 hrs 0 days 11 Mech. Technician-SiDet 200% 1,600 hrs 0 days 12 Research Associate 75% 600 hrs 0 days 13 CMM Programmer-SiDet 10% 80 hrs 0 days 14 Wirebonder-SiDet 100% 800 hrs 0 days ID Resource Name Units Cost Baseline 8 Mech. Engineer-SiDet 25% \$8,470 11 Mech. Technician-SiDet 200% \$46,400 12 Research Associate 75% \$0 13 CMM Programmer-SiDet 10% \$2,320	ID Resource Name Units Work Delay S 8 Mech. Engineer-SiDet 25% 200 hrs 0 days Tue 11 Mech. Technician-SiDet 200% 1,600 hrs 0 days Tue 12 Research Associate 75% 600 hrs 0 days Tue 13 CMM Programmer-SiDet 10% 80 hrs 0 days Tue 14 Wirebonder-SiDet 100% 800 hrs 0 days Tue 1D Resource Name Units Cost Baseline Cost 8 Mech. Engineer-SiDet 25% \$8,470 \$0 11 Mech. Technician-SiDet 200% \$46,400 \$0 12 Research Associate 75% \$0 \$0 13 CMM Programmer-SiDet 10% \$2,320 \$0	ID Resource Name Units Work Delay Start 8 Mech. Engineer-SiDet 25% 200 hrs 0 days Tue 8/19/03 11 Mech. Technician-SiDet 200% 1,600 hrs 0 days Tue 8/19/03 12 Research Associate 75% 600 hrs 0 days Tue 8/19/03 13 CMM Programmer-SiDet 10% 80 hrs 0 days Tue 8/19/03 14 Wirebonder-SiDet 100% 800 hrs 0 days Tue 8/19/03 1D Resource Name Units Cost Baseline Cost Act. Co 8 Mech. Engineer-SiDet 25% \$8,470 \$0 \$0 11 Mech. Technician-SiDet 200% \$46,400 \$0 \$0 12 Research Associate 75% \$0 \$0 \$0 13 CMM Programmer-SiDet 10% \$2,320 \$0 \$0	ID Resource Name Units Work Delay Start 8 Mech. Engineer-SiDet 25% 200 hrs 0 days Tue 8/19/03 The 10/03 11 Mech. Technician-SiDet 200% 1,600 hrs 0 days Tue 8/19/03 The 10/03 12 Research Associate 75% 600 hrs 0 days Tue 8/19/03 The 10/03 13 CMM Programmer-SiDet 10% 80 hrs 0 days Tue 8/19/03 The 10/03 14 Wirebonder-SiDet 100% 800 hrs 0 days Tue 8/19/03 The 10/03 1D Resource Name Units Cost Baseline Cost Act. Cost 8 Mech. Engineer-SiDet 25% \$8,470 \$0 \$0 11 Mech. Technician-SiDet 200% \$46,400 \$0 \$0 12 Research Associate 75% \$0 \$0 \$0 13 CMM Programmer-SiDet 10% \$2,320 \$0 \$0

Notes

We need to provide enough modules to sustain the ramp up stave production from June to October 2003 = 24 staves = 144 modules.

Rate is ~1.5 modules/day

Labor:

- 1. mech. technician (100%)
- 2. mech. technician (100%) a second equivalent mech tech. is accounted here to be taught the job.
- 3. wirebonder (100%)
- 4. postdoc (75%) support
- 5. mech engineer (25%) support
- 6. CMM programmer (10%)

WBS		Nam	ne			Cost				
1.1.3.3.11	Producti	on Modu	ule: contin	gency fixt	tures design	\$14,777	•			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cos
6	Designer-SiDet	75%	120 hrs	0 days	Wed 9/3/03	Tue 9/30/03	\$4,577	\$0	\$0	\$4,57
7	Elect. Engineer	25%	40 hrs	0 days	Wed 9/3/03	Tue 9/30/03	\$2,038	\$0	\$0	\$2,03
8	Mech. Engineer-SiDet	75%	120 hrs	0 days	Wed 9/3/03	Tue 9/30/03	\$5,082	\$0	\$0	\$5,08
9	Elect. Technician	50%	80 hrs	0 days	Wed 9/3/03	Tue 9/30/03	\$1,920	\$0	\$0	\$1,92
11	Mech. Technician-SiDet	25%	40 hrs	0 days	Wed 9/3/03	Tue 9/30/03	\$1,160	\$0	\$0	\$1,16
12	Research Associate	50%	80 hrs	0 davs	Wed 9/3/03	Tue 9/30/03	\$0	\$0	\$0	9

Notes

This is for fixture re-designing and also to get all other support in place for production module construction (support are: boxes, storage, designing G-10 frames for holding/testing modules, programming the CMM machines etc.)

Labor:

- 1. Mech engineer (25%)
- 2. Draftsman (50%)
- 3. mech. technician (25%)
- 4. Elect. Engineer (10%)
- 5. Elect. Technician (25%)
- 6. postdoc (50%)

1.3.3.12		Pro	oduction	modules	: material and t	fixtures	\$70,125			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1	FNALEQ	0%	0 hrs	0 days	Tue 9/30/03	Tue 9/30/03	\$46,750	\$0	\$0	\$46,750
3	FNALCont	0%	0 hrs	0 days	Tue 9/30/03	Tue 9/30/03	\$23,375	\$0	\$0	\$23,375

We assume a similar final design for the fixture and small modifications of the pre-production fixtures in quantity suitable for the production rate.

We assume that we can align up to 6 silicon pairs on a single fixture/day and 1 hybrid/pitch-adapter per day on a single fixture.

- 1. fixtures for detector-detector (5k each) [*0] we don't need extra for production
- 2. fixture for hybrid/pitch to detector (3k each) [*6]
- 3. fixture for wirebonding modules (2k each) [*2]
- 4. testing mechanical setup (2k each) [*0] we don't need extra for production
- 5. G-10 frames (0.025k each) [*750]
- 6. miscellanea materials, boxes, storage cabinets (6K total)

1.1.3.3.	13		Pr	oduction Mo	dules: As	sembling	\$169,176
	ID	Resource Name	Units	Work	Delay	Start	Finish
	8	Mech. Engineer-SiDet	10%	160 hrs	0 days	Tue 1/27/04	Thu 11/4/04
	11	Mech. Technician-SiDet	250%	4,000 hrs	0 days	Tue 1/27/04	Thu 11/4/04
	12	Research Associate	75%	1,200 hrs	0 days	Tue 1/27/04	Thu 11/4/04

WBS			Nam	e				Со	st	
"Production	Mod	ules: Assembling" continue	:d							
	ID	Resource Name	Units	Work	Delay	St	art	F	-inish	
_	14	Wirebonder-SiDet	100%	1,600 hrs	0 days	Tue 1	/27/04	Thu	11/4/04	
	15	Scientist	25%	400 hrs	0 days	Tue 1	/27/04	Thu	ı 11/4/04	
	ID	Resource Name	Units	Cost	Baseline	e Cost	Act. C	ost	Rem. Cost	
_	8	Mech. Engineer-SiDet	10%	\$6,776		\$0		\$0	\$6,776	•
	11	Mech. Technician-SiDet	250%	\$116,000		\$0		\$0	\$116,000	
	12	Research Associate	75%	\$0		\$0		\$0	\$0	
	14	Wirebonder-SiDet	100%	\$46,400		\$0		\$0	\$46,400	
	15	Scientist	25%	\$0		\$0		\$0	\$0	
	Note	25								

Notes

Schedule:

we need to sustain >~1 stave/day >~ 6 modules/day. For 200 staves we need 1200 modules = 200 days.

Labor:

- 1. mech technician (200%)
- wirebonder (100%)
 Scientist (25%) support
- 4. mech engineer (10%) support 5. technician specialist (25%) support
- 6. mech technician (50%) mechanical support
- 7. postdoc (75%) support

	F	(,-)									
1.1.3.3.	14			Productio	n module	es available	\$()			
1.1.3.3.						n complete	\$(
1.1.3				Wiodaic		ayer Staves	\$1,168,60 ⁴				
1.1.3	.4										
1.1.3.4	.1	Proto	type stav	e :Structu	ral and c	ooling R&D	\$100,074	1			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	2	FNALR&D	0%	0 hrs	0 days	Mon 1/7/02	Mon 1/7/02	\$20,000	\$0	\$0	\$20,000
	3	FNALCont	0%	0 hrs	0 days	Mon 1/7/02	Mon 1/7/02	\$10,000	\$0	\$0	\$10,000
	6	Designer-SiDet	100%	640 hrs	0 days	Mon 1/7/02	Fri 4/26/02	\$24,410	\$0	\$0	\$24,410
	8	Mech. Engineer-SiDet	100%	640 hrs	0 days	Mon 1/7/02	Fri 4/26/02	\$27,104	\$0	\$0	\$27,104
	11	Mech. Technician-SiDet	100%	640 hrs	0 days	Mon 1/7/02	Fri 4/26/02	\$18,560	\$0	\$0	\$18,560
	12	Research Associate	50%	320 hrs	0 days	Mon 1/7/02	Fri 4/26/02	\$0	\$0	\$0	\$0
	15	Scientist	25%	160 hrs	0 days	Mon 1/7/02	Fri 4/26/02	\$0	\$0	\$0	\$0
	Note	es									

Cost:

WBS Name Cost

"Prototype stave: Structural and cooling R&D" continued

Notes

we estimated here the cost for parts and fixtures to test various concepts and materials and to sustain a minimum R&D effort on these important issues.

Labor:

includes all labor needed to come up with the final design of the stave and fixtures to build staves.

1.1.3.4.2 Prototype Stave Design complete \$0

Notes

Both the stave and fixtures.

1.1.3.4.3 Prototype Stave: material and fixtures \$99,000 Cost Baseline Cost Act. Cost Rem. Cost Resource Name Units Work Delay Start Finish \$0 FNALR&D Fri 4/26/02 \$66,000 0% 0 hrs 0 days Fri 4/26/02 \$66,000 \$0 **FNALCont** 0% Fri 4/26/02 Fri 4/26/02 \$33.000 \$0 \$0 \$33,000 0 hrs 0 days

Notes

Schedule:

This is the time needed at the machine shop to prepare all fixtures. It also includes the time needed for assembling, inspecting atc. the fixtures. Some fixture will require more time but we assume here that we get at least 1 fixture for flavour in order to start the assembling process.

- Cost:
- 1. mecahnical stave related material and intermediate fixtures (7k total)
- 2. mechanical stave core assembly fixture (5k total)
- 3. laminating the bus cable fixture (5k)
- 5. One set of axial and stereo module alignment fixtures (10k each=20k)
- 6. stave wirebonding fixture (3k each) [*2]
- 7. stave inspection fixture (3k each)
- 8. stave storage boxes (0.5 each) [*20]
- 9. miscellanea material, testing boxes, storage cabinets etc. (10k total)

1.1.3.	4.4	Pro	ototype S	Stave: med	hanical c	onstruction	\$21,948					
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
_	8	Mech. Engineer-SiDet	25%	80 hrs	0 days	Tue 6/11/02	Tue 8/6/02	\$3,388	\$0	\$0	\$3,388	
	11	Mech. Technician-SiDet	200%	640 hrs	0 days	Tue 6/11/02	Tue 8/6/02	\$18,560	\$0	\$0	\$18,560	
	12	Research Associate	50%	160 hrs	0 days	Tue 6/11/02	Tue 8/6/02	\$0	\$0	\$0	\$0	

Notes

This is to prepare a few (~ 30) mechanical staves with the prototype design as part of the electrical stave prototypes milestone.

Schedule:

The start date is driven by the availability of the prototype bus cable. The end date is drivern

by being ready for stave prototype construction when all the other parts are ready. Labor:

1. Mech Tech Specialist (100%) laminating CF sheets, gluing the stave on the mold

WBS			Name	Э				C	ost	
"Prototype		e: mechanical construction"	continue	ed						
	Note 2. Med	es h Technician (100%) Preparing part	ts.							
	3. Med	h Engineer (25%) Support								
		earch Associate (50%) Support								
1.1.3	3.4.5		ototype	Stave: me	chanicals	s availab	le		\$0	
	Note	es mechanical staves								
		mechanical staves								
1.1.3	3.4.6			ype Stave:			-		\$25,336	
	ID	Resource Name	Units	Work	Delay	Sta			Finish	
	8	Mech. Engineer-SiDet	25%	160 hrs	0 days	Wed 7/			d 10/30/02	
	11	Mech. Technician-SiDet	100%	640 hrs	0 days	Wed 7/			d 10/30/02	
	12	Research Associate	25%	160 hrs	0 days	Wed 7/	10/02	We	d 10/30/02	
	ID	Resource Name	Units	Cost	Baselin	e Cost	Act. C	Cost	Rem. Cost	
	8	Mech. Engineer-SiDet	25%	\$6,776		\$0		\$0	\$6,776	
	11	Mech. Technician-SiDet	100%	\$18,560		\$0		\$0	\$18,560	
	12	Research Associate	25%	\$0		\$0		\$0	\$0	
	Note	es								
	This is	all those tests aimed at making sur	e that the d	lesign and ass	sembling pro	ocedures a	re within	our me	chanical specs.	
1.1.3	3.4.7		Prototy	pe Stave:	electrica	ıl asseml	oly		\$29,976	
	ID	Resource Name	Units	Work	Delay	Sta	ırt	Fi	nish	
	8	Mech. Engineer-SiDet	50%	160 hrs	0 days	Thu 8/	/8/02	Thu	10/3/02	
	11	Mech. Technician-SiDet	150%	480 hrs	0 days	Thu 8/	/8/02	Thu	10/3/02	
	12	Research Associate	50%	160 hrs	0 days	Thu 8/	/8/02	Thu	10/3/02	
	13	CMM Programmer-SiDet	50%	160 hrs	0 days	Thu 8/			10/3/02	
	14	Wirebonder-SiDet	50%	160 hrs	0 days	Thu 8/	/8/02	Thu	10/3/02	
	ID	Resource Name	Units	Cost	Baselii	ne Cost	Act. (Cost	Rem. Cost	
	8	Mech. Engineer-SiDet	50%	\$6,776		\$0		\$0	\$6,776	
	11	Mech. Technician-SiDet	150%	\$13,920		\$0		\$0	\$13,920	
	12	Research Associate	50%	\$0		\$0		\$0	\$0	
	13	CMM Programmer-SiDet	50%	\$4,640		\$0		\$ 0	\$4,640	
	14	Wirebonder-SiDet	50%	\$4,640		\$0		\$0	\$4,640	

Name Cost "Prototype Stave: electrical assembly" continued Notes Schedule: The beginning of this task is driven by having prototype modules available, which is driven by the sensors. We assume it will take 2 weeks to make the 1st prototype electrical stave. We are buying enough prototype parts to make 5 electrical staves. and the duration of 40 days is to make 5 staves. 1. Mech Technician (100%) gluing/aligning modules on staves 2. Mech Technician (50%) bonding 3. Mech Tech Specialist (50%) overseeing, troubleshooting etc. 4. Research Associate (50%) Support 5. Mech. Engineer (50%) Support 6. CMM programmer (50%) 1.1.3.4.8 Prototype Stave: electrical testing \$10,394 Resource Name Units Work Delay Start Finish 0 days Elect. Engineer 25% 130 hrs Thu 8/15/02 Thu 11/14/02 10 Elect. Technician-SiDet 25% 130 hrs 0 days Thu 8/15/02 Thu 11/14/02 12 Research Associate 200% 1,040 hrs 0 davs Thu 8/15/02 Thu 11/14/02 260 hrs 15 Scientist 50% 0 davs Thu 8/15/02 Thu 11/14/02 Resource Name Cost **Baseline Cost** Act. Cost Rem. Cost Units \$0 \$0 Elect. Engineer 25% \$6,624 \$6,624 Elect. Technician-SiDet 25% \$3.770 \$0 \$0 \$3,770 Research Associate \$0 \$0 \$0 \$0 200% \$0 15 Scientist 50% \$0 \$0 \$0 Notes This is ALL the electrical testing crew at FNAL. We don't divide it up between hybrid, modules, stayes and burn-in staye parts. All SiDet electrical testing (up to the Staye) is considered here in terms of labor. The prototype effort is estimated based on a total of 4 FTE postdocs + 1 FTE scientist + 0.5 FTE electrical technician (for repair) for the PRODUCTION. 1.1.3.4.9 MILESTONE#1: Prototype Stave available We assume it will take 2 weeks (10d) to put all the parts together to make the first prototype stave.

Notes

1.1.3.4.10

There is no cost and no labor here because this is just a Schedule Contingency.

Cost and labor are already estimated for the milestone #1

Contingency Stave: electrical assembly

WBS	Name	Cost	
	Contingency Stave: electric		
N1-1			

Notes

Labor:

This is ALL the electrical testing crew at FNAL. We don't divide it up between hybrid, modules, staves and burn-in stave parts. All SiDet electrical testing (up to the Stave) is considered here in terms of labor. The prototype effort is estimated based on a total of 4 FTE postdocs + 1 FTE scientist + 0.5 FTE electrical technician (for repair) for the PRODUCTION.

1.1.3.4.12 MILESTONE#1*: Contingency Stave available \$0

Notes

We assume it will take 2 weeks (10d) to put all the parts together to make the first prototype stave.

1.1.3.4.13				Production	າ Stave: f	ign		\$35,096	
	ID	Resource Name	Units	Work	Delay	Sta	art		Finish
	6	Designer-SiDet	100%	400 hrs	0 days	Thu 10)/31/02	W	ed 1/22/03
	8	Mech. Engineer-SiDet	100%	400 hrs	0 days	Thu 10)/31/02	W	ed 1/22/03
	11	Mech. Technician-SiDet	25%	100 hrs	s 0 days Thu 10/31/02)/31/02	W	ed 1/22/03
	ID	Resource Name	Units	Cost	Baselin	e Cost	Act. Co	st	Rem. Cost
	6	Designer-SiDet	100%	\$15,256		\$0	(60	\$15,256
	8	Mech. Engineer-SiDet	100%	\$16,940		\$0	(60	\$16,940
	11	Mech. Technician-SiDet	25%	\$2,900		\$0	(5 0	\$2,900

Notes

This is the final design of the mechanical stave and takes advantage of all possible tests done on the prototype staves.

1.1.3.4.1	4	Production	Stave: materia	ll and fixtures	\$415,125

ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1	FNALEQ	0%	0 hrs	0 days	Wed 1/22/03	Wed 1/22/03	\$276,750	\$0	\$0	\$276,750
3	FNALCont	0%	0 hrs	0 days	Wed 1/22/03	Wed 1/22/03	\$138,375	\$0	\$0	\$138,375

Notes

This is the time needed at the machine shop to prepare all fixtures for production.

Material etc. could be purchaised in advance.

Cost

We assume we re-do all fixtures in number adequate to sustain production.

- 1. mecahnical stave related material and intermediate fixtures (120,75k total)
- 2. mechanical stave core assembly fixture (5k total) [*2]
- 3. laminating the bus cable fixture (3k) [*4]
- 5. One set of axial and stereo module alignment fixtures (15k each=30k) [*2]
- 6. stave wirebonding fixture (3k each) [*2]
- 7. stave inspection fixture (3k each)
- 8. stave storage boxes (0.5 each) [*100]
- 9. miscellanea material, testing boxes, storage cabinets etc. (25k total)

WBS			Nam	e				C	Cost	
1.1.3.4	.15	Preprod	duction S	Stave: mec	hanical co	onstructi	on		\$26,588	
	ID	Resource Name	Units	Work	Delay	Stai	rt	F	inish	
-	8	Mech. Engineer-SiDet	25%	80 hrs	0 days	Mon 6/	2/03	Mon	7/28/03	
	11	Mech. Technician-SiDet	250%	800 hrs	0 days	Mon 6/	2/03	Mon	7/28/03	
	12	Research Associate	50%	160 hrs	0 days	Mon 6/	2/03	Mon	7/28/03	
	ID	Resource Name	Units	Cost	Baseline	e Cost	Act.	Cost	Rem. Cost	
-	8	Mech. Engineer-SiDet	25%	\$3,388		\$0		\$0	\$3,388	-
	11	Mech. Technician-SiDet	250%	\$23,200		\$0		\$0	\$23,200	
	12	Research Associate	50%	\$0		\$0		\$0	\$0	

Notes

This is to prepare more than 30 mechanical staves with the final design.

Preproduction is to build 24 electrical stave. We should be able to sustain a production rate of ~3 mechanical staves per day. Here we assume that we have a ramp-up at an average rate of ~ 1 stave/day.

Schedule:

The start date is driven by having finished the final stave design and the readiness of the production bus cable. Also we assume that we commit to the final fixture design during the previous tasks. This means that a certain number of identical fixtures need to be machined.

The end date is drivern by being ready for stave preproduction construction when all the other preproduction parts are ready.

Labor:

- Mech. tech (200%) preparing parts and assembling
 Mech. tech Specialist (50%) this is for support and troubleshooting
- 3. Mech Engineer (25%) support
- 4. Research Associate (50%) support

1.1.3.4.	.16	Pr	eproduction	Stave: m	echanical	s available		\$0	
	Note	es							
Ŧ	his is	mechanical staves							
1.1.3.4.	.17		Preproduc	tion Stave	: mechan	ical testing		\$6,334	
	ID	Resource Name	Units	Work	Delay	Start		Finish	
_	8	Mech. Engineer-SiDet	t 25%	40 hrs	0 days	Mon 6/16	/03 I	Mon 7/14/03	
	11	Mech. Technician-SiDe	et 100%	160 hrs	0 days	Mon 6/16	/03 I	Mon 7/14/03	
	12	Research Associate	25%	40 hrs	0 days	Mon 6/16	/03 I	Mon 7/14/03	
	ID	Resource Name	Units	Cost	Baseline	Cost Act	t. Cost	Rem. Cost	
	8	Mech. Engineer-SiDe	t 25%	\$1,694		\$0	\$0	\$1,694	
	11	Mech. Technician-SiDe	et 100%	\$4,640		\$0	\$0	\$4,640	
	12	Research Associate	25%	\$0		\$0	\$0	\$0	

WBS	Name	Cost	

"Preproduction Stave: mechanical testing" continued

Notes

This is all those remaining tests aimed at making sure that the design and assembling procedures are within our mechanical specs. Already extensive tests were made on the prototype stave. Nonetheless we need to re-verify for the production

1.1.3.4	1.18	Pre	Preproduction Stave: electrical assembly							
	ID	Resource Name	Units	nits Work Delay			tart		Finish	
	8	Mech. Engineer-SiDet	25%	140 hrs	0 days	Wed	9/3/03	Thu	ı 12/11/03	
	11	Mech. Technician-SiDet	225%	1,260 hrs	0 days	Wed	9/3/03	Thι	ı 12/11/03	
	12	Research Associate	100%	560 hrs	0 days	Wed	9/3/03	Thι	ı 12/11/03	
	13	CMM Programmer-SiDet	10%	56 hrs	0 days	Wed	9/3/03	Thι	ı 12/11/03	
	14	Wirebonder-SiDet	50%	280 hrs	0 days	Wed	9/3/03	Thι	ı 12/11/03	
	ID	Resource Name	Units	Cost	Baseline	Cost	Act. Co	st	Rem. Cost	
	8	Mech. Engineer-SiDet	25%	\$5,929		\$0	Ç	\$0	\$5,929	
	11	Mech. Technician-SiDet	225%	\$36,540		\$0	9	\$0	\$36,540	
	12	Research Associate	100%	\$0		\$0	9	\$0	\$0	
	13	CMM Programmer-SiDet	10%	\$1,624		\$0	5	\$0	\$1,624	
	14	Wirebonder-SiDet	50%	\$8,120		\$0	9	\$0	\$8,120	

Notes

Schedule:

This is driven by having preproduction modules available.

We will use production bus cables, production sensors

preproduction hybrids (we call these preproduction modules)

and preproduction Miniportcards.

We want to build 24 electrical staves during the ramp up period from June to September 2003.

This is a rate of ~2 complete staves/week.

Labor:

Labor:

- 1. Mech Technician (100%) installing/aligning modules on the stave
- 2. Mech Technician (50%) bonder
- 3. Mech Technician (75%) support, inspection etc.
- 4. Mech. Engineer (25%) support
- 5. Mech Tech Specialist (50%) support, troubleshooting
- 6. Research Associate (100%) support

1.1.3.4.19 Preproduction Stave: electricals available \$0

Notes

We assume it will take 2 weeks (10d) to put all the parts together to make the first prototype stave.

WBS		Nam	е			Cost	
1.1.3.4.20		Preproc	duction Stav	e: electric	al testing	\$6,960	
ID	Resource Name	Units	Work	Delay	Start	Finish	
10	Elect. Technician-SiDet	50%	160 hrs	0 days	Wed 9/10/03	Tue 11/4/03	-
11	Mech. Technician-SiDet	25%	80 hrs	0 days	Wed 9/10/03	Tue 11/4/03	
12	Research Associate	400%	1,280 hrs	0 days	Wed 9/10/03	Tue 11/4/03	
15	Scientist	100%	320 hrs	0 days	Wed 9/10/03	Tue 11/4/03	
ID	Resource Name	Units	Cost	Baseline C	Cost Act. Cost	Rem. Cost	
10	Elect. Technician-SiDet	50%	\$4,640		\$0 \$0	\$4,640	
11	Mech. Technician-SiDet	25%	\$2,320		\$0 \$0	\$2,320	
12	Research Associate	400%	\$0		\$0 \$0	\$0	
15	Scientist	100%	\$0		\$0 \$0	\$0	

Notes

Labor:

This is ALL the electrical testing crew at FNAL. We don't divide it up between hybrid, modules, staves and burn-in stave parts. All SiDet electrical testing (up to the Stave) is considered here in terms of labor.

It is estimated to be a total of:

- 1. postdocs (400%)
- 2. scientist (100%) responsible for quality control
- 3. electrical techician (50%) for repair and minor support jobs
- 4. mech technician (25%) for repair/redo bonds

		h technician (25%) for repair/redo bo		011 1000					
1.1.3.4.2	21		Evalu	ation of p	reproduct	ion sta	ves		\$21,384
	ID	Resource Name	Units	Work	Delay	S	Start		Finish
_	7	Elect. Engineer	25%	80 hrs	0 days	Wed	9/10/03	Т	ue 11/4/03
	8	Mech. Engineer-SiDet	25%	80 hrs	0 days	Wed	9/10/03	Т	ue 11/4/03
	11	Mech. Technician-SiDet	100%	320 hrs	0 days	Wed	9/10/03	Т	ue 11/4/03
	12	Research Associate	200%	640 hrs	0 days	Wed	9/10/03	Т	ue 11/4/03
	13	CMM Programmer-SiDet	50%	160 hrs	0 days	Wed	9/10/03	Т	ue 11/4/03
	15	Scientist	100%	320 hrs	0 days	Wed	9/10/03	Т	ue 11/4/03
_	ID	Resource Name	Units	Cost	Baseline	Cost	Act. Co	st	Rem. Cost
	7	Elect. Engineer	25%	\$4,076		\$0	9	\$0	\$4,076
	8	Mech. Engineer-SiDet	25%	\$3,388		\$0	5	\$0	\$3,388
	11	Mech. Technician-SiDet	100%	\$9,280		\$0	5	\$0	\$9,280
	12	Research Associate	200%	\$0		\$0	5	\$0	\$0
	13	CMM Programmer-SiDet	50%	\$4,640		\$0	5	\$0	\$4,640
	15	Scientist	100%	\$0		\$0	5	\$0	\$0

WBS			Nam	ıe				Cost			
	n of ni	eproduction staves" contir									
Lvaldatio	Not	•	idod								
1.1.3.	This is structu All this	both a mechanical and electrical erre. labor is ON TOP of the normal ele	ectrical test	ing labor.		ving the green n go-aheac		rt production. \\$0	We assume here mind	or modification to	o the entire production
	Not	es	<u></u>								
	This m	illestone allows to proceed into sta	ve production	on.							
1.1.3.	4.23	Productio	n Stave:	modificati	on to the	final design		\$21,301			
	ID	Resource Name	Units	Work	Delay	Start		Finish			
	6	Designer-SiDet	100%	320 hrs	,	Wed 9/10		ue 11/4/03	_		
	8	Mech. Engineer-SiDet	50%	160 hrs		Wed 9/10		ue 11/4/03			
	11	Mech. Technician-SiDet	25%	80 hrs	0 days	Wed 9/10)/03 I	ue 11/4/03			
	ID	Resource Name	Units	Cost			ct. Cost				
	6	Designer-SiDet	100%	\$12,205		\$0	\$0				
	8	Mech. Engineer-SiDet	50%	\$6,776		\$0	\$0				
	11	Mech. Technician-SiDet	25%	\$2,320		\$0	\$0	\$2,3	20		
	Not		_								
		a contingency task to modify the f	inal design	of the stave ((fixtures etc.)	and takes adv	antage of	the tests done	on the pre-production	phase.	
1.1.3.	4.24	Production S	tave: co	ntingency	material a	and fixtures	3	\$69,000			
	ID	Resource Name Units	Work	Delay	Start		nish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	FNALEQ 0%	0 hrs	0 days	Tue 11/4		1/4/03	\$46,000	\$0	\$0	\$46,000
	3	FNALCont 0%	0 hrs	0 days	Tue 11/4	/03 Tue ′	1/4/03	\$23,000	\$0	\$0	\$23,000
	Not	es									
	Cost:		_								
		sume that some fixture (or equivale of stave mechanical fixtures (10K)	nt parts) ne	eds to be rec	done or modif	fied:					
	2. bus	cable laminating fixture (6k)									
		e alignment fixture (20k) e/modify boxes for storing/testing (10k total)								
1.1.3.	4.25	Pro				construction		\$48,536			
	<u>ID</u>	Resource Name	Units	Work	Delay			Finish			
	8	Mech. Engineer-SiDet	25%	160 hr	,			hu 5/6/04			
	11	Mech. Technician-SiDet	225%	1,440 hr	rs 0 day	s Fri 1/16	6/04 T	hu 5/6/04			

WBS	Name	Cost
-----	------	------

"Production Stave: mechanical construction" continued

ID	Resource Name	Units	Work	Delay	Start	I	-inish
12	Research Associate	50%	320 hrs	0 days	Fri 1/16/04	Th	u 5/6/04
ID	Resource Name	Units	Cost	Baseline	Cost Act. (Cost	Rem. Cost
8	Mech. Engineer-SiDet	25%	\$6,776		\$0	\$0	\$6,776
11	Mech. Technician-SiDet	225%	\$41,760		\$0	\$0	\$41,760
12	Research Associate	50%	\$0		\$0	\$0	\$0

Notes

This is to prepare ~200 mechanical staves with the final design.

Schedule:

We assume we can produce 3 mechanical staves/day: 240 staves = 80days

This task should start as soon as the mechanical is shown to work.

Labor:

Work is divided into 3 major sections:

- a. preparation of parts (inlcudes bending peek tubing, cutting parts to size etc.)
- b. laminating the bus cable to the carbon fiber sheet
- c. putting all parts in a mold and glue them
- 1. Mech. tech (200%) preparing parts and assembling
- 2. Mech. tech Specialist (25%) this is for support and troubleshooting
- 3. Mech Engineer (25%) support
- 4. Research Associate (50%) support

1.1.3.4.26	Pr	oduction	Stave: med	hanicals a	availabl	е	\$0	0
1.1.3.4.27		Producti	on Stave: e	electrical a	ssembl	У	\$144,540	0
ID	Resource Name	Units	Work	Delay	St	art	Finisl	h
8	Mech. Engineer-SiDet	25%	400 hrs	0 days	Tue 2	/10/04	Thu 11/1	8/04
11	Mech. Technician-SiDet	200%	3,200 hrs	0 days	Tue 2	/10/04	Thu 11/1	8/04
12	Research Associate	100%	1,600 hrs	0 days	Tue 2	/10/04	Thu 11/1	8/04
13	CMM Programmer-SiDet	25%	400 hrs	0 days	Tue 2	/10/04	Thu 11/1	8/04
14	Wirebonder-SiDet	50%	800 hrs	0 days	Tue 2	/10/04	Thu 11/1	8/04
15	Scientist	50%	800 hrs	0 days	Tue 2	/10/04	Thu 11/1	8/04
ID	Resource Name	Units	Cost	Baseline	Cost	Act. Co	st Rem.	Cost
8	Mech. Engineer-SiDet	25%	\$16,940		\$0	\$	50 \$16	5,940
11	Mech. Technician-SiDet	200%	\$92,800		\$0	\$	50 \$92	2,800
12	Research Associate	100%	\$0		\$0	\$	0	\$0
13	CMM Programmer-SiDet	25%	\$11,600		\$0	\$	50 \$1 ²	1,600

WBS	Name	Cost

"Production Stave: electrical assembly" continued

ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost
14	Wirebonder-SiDet	50%	\$23,200	\$0	\$0	\$23,200
15	Scientist	50%	\$0	\$0	\$0	\$0

Notes

Schedule:

This is driven by having preproduction modules available.

We will use production bus cables, production sensors

preproduction hybrids (we call these preproduction modules)

and preproduction Miniportcards.

We need to build electrical staves at a rate of \geq 1 stave/day.

Labor:

- 1. Mech Technician (100%) installing/aligning modules on the stave
- 2. Mech Technician (50%) bonder
- 3. Mech Technician (75%) support, inspection etc.
- 4. Mech. Engineer (25%) support
- 5. Mech Tech Specialist (25%) support, troubleshooting
- 6. Research Associate (100%) support
- 7. Scientist (50%) supervision

1.1.3.4	4.28		Prod	luction Stav	e: electric	al testir	ng	\$34,800
	ID	Resource Name	Units	Work	Delay	St	art	Finish
	10	Elect. Technician-SiDet	50%	800 hrs	0 days	Tue 2	/17/04 N	/lon 11/29/04
	11	Mech. Technician-SiDet	25%	400 hrs	0 days	Tue 2	/17/04 N	/lon 11/29/04
	12	Research Associate	400%	6,400 hrs	0 days	Tue 2	/17/04 N	/lon 11/29/04
	15	Scientist	100%	1,600 hrs	0 days	Tue 2	/17/04 N	/lon 11/29/04
	ID	Resource Name	Units	Cost	Baseline	Cost	Act. Cost	Rem. Cost
	10	Elect. Technician-SiDet	50%	\$23,200		\$0	\$0	\$23,200
	11	Mech. Technician-SiDet	25%	\$11,600		\$0	\$0	\$11,600
	12	Research Associate	400%	\$0		\$0	\$0	\$0
	15	Scientist	100%	\$0		\$0	\$0	\$0

Notes

This is again ALL the electrical testing crew at FNAL. We don't divide it up between hybrid, modules, staves and burn-in stave parts. All SiDet electrical testing (up to the Stave) is considered here in terms of labor.

It is estimated to be a total of:

- 1. postdocs (400%)
- 2. scientist (100%) responsible for quality control
- 3. electrical techician (50%) for repair and minor support jobs
- 4. mech technician (25%) bonder, for repair/redo bonds

WBS				Nan	ne			Cost						
1.1.3	4.29				Produc	tion Stav	es Available		\$0					
1.1.3									\$ 0					
1.1.3	.4.30				Slave	Produciio	on Complete		ΨU					
	1.1.4						Beampipe	\$237	,771					
	Not	es		_										
	stainle the tota	eampipe is designed to be ss steel sections on the e al cost of the D0 pipe. The pipes are	end. Wea	are conside	ering a drilled	technology	rather than the tra	ditional rolled to						е
1.	1.4.1					Desig	gn beampipe	\$12	,878					
	ID	Resource Name		Units	Work	Delay	Start	Finish	Cost	Baseline Co	ost Act.	Cost	Rem. Cost	
	6	Designer-SiDet		50%	160 hrs	0 days	Mon 1/7/02	Fri 3/1/02	\$6,102		\$0	\$0	\$6,102	
	8	Mech. Engineer-	SiDet	50%	160 hrs	0 days	Mon 1/7/02	Fri 3/1/02	\$6,776		\$0	\$0	\$6,776	
	15	Scientist		10%	32 hrs	0 days	Mon 1/7/02	Fri 3/1/02	\$0		\$0	\$0	\$0	
	Not	es												
		nd D0 agreed on a wall th				lium section	of the pipes.							
	The re	duces the total cost and	also the d	elivery sch	edule.									
1.	1.4.2				Beam	pipe desi	gn complete		\$0					
	Not	es					9 1		* -					
		finished and sent out fo	r quotatior	s on price	for rolled an	d drilled pipe	es.							
1.	1.4.3					procu	re beampipe	\$224	,893					
	ID	Resource Name	Units	Work	Delay	Star	t Fini	sh C	ost B	aseline Cost	Act. Co	st Re	em. Cost	
	1	FNALEQ	0%	0 hrs	0 days	Tue 7/23	3/02 Tue 7/2	23/02 \$14	9,893	\$0	\$	0 \$	149,893	
	3	FNALCont	0%	0 hrs	0 days	Tue 7/23	3/02 Tue 7/2	23/02 \$7	5,000	\$0	\$	0	\$75,000	
	Note	es		-										
	based \$149,8	on quotation n13002 Feb 93 for a new drilled Be p % cont. to cost.												
1	1 1 1					Doomo:	no ovojlobla		ው					
	1.4.4 1.1.5						pe available t Mechanics	\$1,575	\$0 .852					
	•							Ţ.,J.	,					

Notes
This section covers infrastucture, the support structures for the staves, barrels, L0, and transportation and installation at B0. 50% cont. is included on all costed items

WBS				Nam	ıe			Cost					
1.1.5	1				Mec	hanical In	frastructure	\$200,000) 1				
	v. i Note	76			IVICO	nanca ni	irastructure	Ψ200,000	,				
_		appropriate contingency to a	all coste	ed items									
1.1.5.1						Procure	e 3m CMM	\$200,000)				
	ID	Resource Name U	Inits	Work	Delay	Start	Finish	Cost	Baselin	e Cost	Act. Cos	st Rem. C	ost
_	2		0%	0 hrs	0 days	Mon 1/7/0		. ,		\$0		0 \$200,0	
	3	FNALCont	0%	0 hrs	0 days	Mon 1/7/0	02 Mon 1/7/	02 \$0		\$0	\$	0	\$0
1	Note	es											
Tr	nis wa	as paid from by the Japanes	e in ex	change for	FNAL paym	ent on senso	rs later						
1.1.5	.2				Silico	n Support	t Structures	\$1,134,490)				
1	Note	es											
		sk covers the bulkheads whi	ich sup	port the st	aves, the scr	eens which a	attach the bulkhead	ls to each other, th	e tube which	supprts the	e barrels (sp	pacetube in Rui	n IIa) and the
SU	ıpport	t structure for L0.											
1.1.5.2	.1						Bulkheads	\$437,999)				
1	Note	es											
		sk is comprehensive of:			D	(° - (1)	al Al (as tages al)						
		ernal and 2 internal CF bulk screen	neads	with precis	sion Berillium	(internal) and	d Al (external) m	ounting features.					
		es for holding/aligning the b	ulkhea	ds togethe	r								
1.1.5.2.1	.1			Ві	ulkhead li	nitial Cond	ept studies	\$36,442					
	ID	Resource Name		Units	Work	Delay	Start	Finish	Cost	Baselir	ne Cost	Act. Cost	Rem. Cost
	6	Designer-SiDet		50%	240 hrs	,	Mon 1/7/02	Fri 3/29/02	\$9,154		\$0	\$0	\$9,154
	8	Mech. Engineer-Si		100%	480 hrs	0 days	Mon 1/7/02	Fri 3/29/02	\$20,328		\$0	\$0	\$20,328
	11	Mech. Technician-S		50%	240 hrs	0 days	Mon 1/7/02	Fri 3/29/02	\$6,960		\$ 0	\$0	\$6,960
,	12	Research Associate		50%	240 hrs	0 days	Mon 1/7/02	Fri 3/29/02	\$0		\$0	\$0	\$0
	Note												
	20/20					ldessals Dass							
Pr	rototy	esee the need for 4 (2 outer pe bulkheads made from G				kneads. Pred	ision mounting pin	s with matching n	oles on the st	ave ensure	e alignment.		
	abor: ostly	engineer type labor.											
1.1.5.2.1					Bulkhe	ad Prototy	/pe: Design	\$25,757	•				
	ID	Resource Name		Units	Work	Delay	Start	Finish	Cost	Baselin	e Cost	Act. Cost	Rem. Cost
_	6	Designer-SiDet		100%	320 hrs		Mon 4/1/02		\$12,205		\$0	\$0	\$12,205

WBS				Nam	ıe			Cost					
"Bulkhead		type: Design" conti	nued				•						
	<u>ID</u>	Resource Name	0:5 .	Units	Work	Delay	Start	Finish	Cost	Baseline		Act. Cost	Rem. Cost
	8	Mech. Engineer-		100%	320 hrs	0 days	Mon 4/1/02	Fri 5/24/02	\$13,552		\$0 \$0	\$0 \$0	\$13,552
	12	Research Associa	ate	50%	160 hrs	0 days	Mon 4/1/02	Fri 5/24/02	\$0		\$0	\$0	\$0
	Not	es											
	Details	to finalise the first protot of mounting hardware a ed analysis of Bulkhead s	nd fixturing	will be inc	cluded at this								
1.1.5.2	2.1.3			E	Bulkhead I	Prototype:	fabrication	\$75,0	00				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline	Cost Ac	ct. Cost	Rem. Co:	st
	2	FNALR&D	0%	0 hrs	0 days	Fri 5/24/0		. ,		\$0	\$0		
	3	FNALCont	0%	0 hrs	0 days	Fri 5/24/0	02 Fri 5/24/0	2 \$25,000		\$0	\$0	\$25,00	0
	Not	es											
1.1.5.2	This in	imate the need for 2 CF I	ture for loc	ating the p	resicion pins		ip. and testing	\$26,8	68				
	ID	Resource Name		Units	Work	Delay	Start	Finis	sh				
	8	Mech. Engineer-	SiDet	50%		0 days	Wed 7/24/0	2 Wed 10	/16/02				
	11	Mech. Techniciar	n-SiDet	100%	480 hrs	o days	Wed 7/24/0	2 Wed 10	/16/02				
	13	CMM Programme	er-SiDet	20%	96 hrs	0 days	Wed 7/24/0	2 Wed 10	/16/02				
	ID	Resource Name		Units	Cost	Baseli	ne Cost Act	. Cost Ren	n. Cost				
	8	Mech. Engineer-	SiDet	50%	\$10,16		\$0	\$0 \$	10,164				
	11	Mech. Techniciar		100%	\$13,92	0	\$0		13,920				
	13	CMM Programme	er-SiDet	20%	\$2,78	4	\$0	\$0	\$2,784				
	Not	es											
1.1.5.2	The ali	the labor associated with gnment and construction iffness of the bulkheads	of the fixt	ure will be	performed or ationl and pos	n a CMM. sitioning in a		tested. \$25,7	57				
	ID	Resource Name		Units	Work	Delay	Start	Finish					
	6	Designer-SiDet		100%	320 hrs	0 days	Thu 10/17/02						
	8	Mech. Engineer-	SiDet	100%	320 hrs	0 days	Thu 10/17/02	? Fri 12/13/	02				

	Resource Nan	ne	Units	Work	Delay	Sta	art	F	inish			
12	Research Ass	ociate	50%	160 hrs	0 days	Thu 10)/17/02	Fri 1	2/13/02			
ID	Resource Nan	ne	Units	Cost	Baseline	Cost	Act. Co	st F	Rem. Cost			
6	Designer-SiDe	et	100%	\$12,205		\$0	\$	60	\$12,205	_		
8	Mech. Engine		100%	\$13,552		\$0		60	\$13,552			
12	Research Ass	ociate	50%	\$0		\$0	\$	60	\$0			
	otes		-									
Desi	gn will be modified as	needed by the	results of th	ne tests								
1.1.5.2.1.6			Bu	Ikhead Fir	al Design	Comp	lete		\$0			
1.1.5.2.1.7				Е	Bulkhead: 1	abrica	tion	\$1	195,000			
ID		ne Units	Work	Delay	Start		Finish		Cost	Baseline Cost	Act. Cost	Rem. Cost
1	FNALEQ	0%	0 hrs		Fri 12/13/0		i 12/13/0		130,000	\$0	\$0	\$130,000
3	FNALCont	0%	0 hrs	0 days	Fri 12/13/0)2 Fr	i 12/13/0	2	\$65,000	\$0	\$0	\$65,000
No												
No Cost	otes											
Cost	otes	20K each CF b	- oulkhead (4	+ 2 spares) +	-10K for extra	ı material	l.					
Cost: we es	otes :	20K each CF b	- oulkhead (4					9	553,176			
Cost: we es	otes : stimate the cost to be :		oulkhead (4 Units		10K for extra d: assemb Delay	oly, tes			553,176 Finish			
Cost: we es	otes : stimate the cost to be :	ne		Bulkhea	d: assemb Delay	oly, tes	ting		•			
Cost: we e: 1.1.5.2.1.8 ID	etes : stimate the cost to be: Resource Nan Mech. Engine	ne er-SiDet	Units	Bulkhea Work	d: assemb Delay	oly, tes	ting Start	М	Finish			
Cost: we ex 1.1.5.2.1.8 <u>ID</u> 8	Resource Nan Mech. Engine Mech. Technic	ne er-SiDet cian-SiDet	Units 25%	Bulkhea Work 160 hi	d: assemb Delay s 0 days	oly, tes s Thus Thus	ting Start u 5/15/03	Mo Mo	Finish on 9/8/03			
Cost we es 1.1.5.2.1.8 ID 8 11	Resource Nan Mech. Engine Mech. Technic Research Asse	ne er-SiDet cian-SiDet ociate	Units 25% 200% 50%	Bulkhea Work 160 hi 1,280 hi	d: assemb Delay rs 0 days rs 0 days	oly, tes S Thus Thus Thus	ting Start J 5/15/03 J 5/15/03	Mo Mo Mo	Finish on 9/8/03 on 9/8/03			
Cost we es 1.1.5.2.1.8 ID 8 11 12	Resource Nan Mech. Engine Mech. Technic Research Asso	ne er-SiDet cian-SiDet ociate nmer-SiDet	Units 25% 200% 50%	Bulkhea Work 160 hi 1,280 hi 320 hi	d: assemb Delay rs 0 days rs 0 days	oly, tes	ting Start J 5/15/03 J 5/15/03 J 5/15/03 J 5/15/03	Mo Mo Mo	Finish on 9/8/03 on 9/8/03 on 9/8/03			
Cost we es 1.1.5.2.1.8 ID 8 11 12 13	Resource Nan Mech. Engine Mech. Technic Research Asso	ne er-SiDet cian-SiDet ociate nmer-SiDet	Units 25% 200% 50% 50%	Bulkhea Work 160 hi 1,280 hi 320 hi	d: assemb Delay rs 0 days rs 0 days rs 0 days rs 0 days rs 0 days	oly, tes	ting Start 1 5/15/03 1 5/15/03 1 5/15/03 1 5/15/03 1 Act. C	Mo Mo Mo	Finish on 9/8/03 on 9/8/03 on 9/8/03 on 9/8/03			
Eost we es 1.1.5.2.1.8 ID 8 11 12 13	Resource Nan Mech. Engine Research Ass CMM Program Resource Nan Mech. Engine	ne eer-SiDet cian-SiDet ociate nmer-SiDet eer-SiDet	Units 25% 200% 50% 50% Units	Bulkhea Work 160 hi 1,280 hi 320 hi Cost	d: assemb Delay s 0 days s 0 days s 0 days s 0 days Baselin	oly, tes	ting Start J 5/15/03 J 5/15/03 J 5/15/03 J 5/15/03 J 5/15/03	Mo Mo Mo	Finish on 9/8/03 on 9/8/03 on 9/8/03 on 9/8/03 Rem. Cos	6		
Cost we ex	Resource Nan Mech. Engine Research Ass CMM Program Resource Nan Mech. Engine Research Ass CMM Program Resource Nan Mech. Engine Mech. Engine	ne er-SiDet cian-SiDet ociate nmer-SiDet ne er-SiDet cian-SiDet	Units 25% 200% 50% 50% Units 25%	Bulkhea Work 160 hi 1,280 hi 320 hi 320 hi Cost \$6,776	d: assemble Delayers 0 dayers 0 dayers 0 dayers 0 dayers Baselin	oly, tesi s Thus Thus Thus Thus Thus Thus Thus Thu	ting Start 2 5/15/03 2 5/15/03 2 5/15/03 2 5/15/03 3 Act. C	Mo Mo Mo Sost	Finish on 9/8/03 on 9/8/03 on 9/8/03 Rem. Cos	6 0		
Cost we ex 1.1.5.2.1.8 ID 8 11 12 13 ID 8 11	Resource Nan Mech. Engine Research Asso CMM Program Resource Nan Mech. Engine Resource Nan Resource Nan Mech. Engine Resource Nan Mech. Engine Mech. Technic	ne er-SiDet cian-SiDet cociate nmer-SiDet eer-SiDet cian-SiDet	Units 25% 200% 50% 50% Units 25% 200% 50%	Bulkhea Work 160 hi 1,280 hi 320 hi 320 hi Cost \$6,776 \$37,120	d: assemb Delay s 0 days s 0 days s 0 days s 0 days Baselin	s Thus Thus Thus Thus Thus Thus S Thus S Thus S Thus S S S S S S S S S S S S S S S S S S S	ting Start 2 5/15/03 2 5/15/03 2 5/15/03 2 5/15/03 3 Act. C	Mo Mo Mo Sost \$0 \$0	Finish on 9/8/03 on 9/8/03 on 9/8/03 on 9/8/03 Rem. Cos \$6,77 \$37,12	6 0 0		
Cost we es 1.1.5.2.1.8 ID 8 11 12 13 ID 8 11 12 13	Resource Nan Mech. Engine Research Asso CMM Program Resource Nan Mech. Engine Resource Nan Resource Nan Mech. Engine Resource Nan Mech. Engine Mech. Technic	ne er-SiDet cian-SiDet cociate nmer-SiDet eer-SiDet cian-SiDet	Units 25% 200% 50% 50% Units 25% 200% 50%	Bulkhea Work 160 hi 1,280 hi 320 hi 320 hi Cost \$6,776 \$37,120	d: assemb Delay s 0 days s 0 days s 0 days s 0 days Baselin	s Thus Thus Thus Thus Thus S Thus S Thus S Thus S Thus S S S S S S S S S S S S S S S S S S S	ting Start 2 5/15/03 2 5/15/03 2 5/15/03 2 5/15/03 3 Act. C	Mo Mo Mo Sost \$0 \$0 \$0	Finish on 9/8/03 on 9/8/03 on 9/8/03 on 9/8/03 Rem. Cos \$6,77 \$37,12	6 0 0		

WBS				Nam	ıe			Cost			
1.1.5	. 2 2						screens	\$398,746			
1.1.5	Not	es					30166113	φ390,740			
		are the Inner and Outer	screens fo	- or the outer	barrel.						
1.1.5.2	2.2.1					Design oute	er screen	\$38,635			
	ID	Resource Name		Units	Work	Delay	Start	Finish			
	6	Designer-SiDet		100%	480 hrs		lon 12/16/02	Wed 3/19/03			
	8 12	Mech. Engineer- Research Associa		100% 25%	480 hrs 120 hrs		1on 12/16/02 1on 12/16/02	Wed 3/19/03 Wed 3/19/03			
			ale			•					
	1D 6	Resource Name Designer-SiDet		Units 100%	Cost \$18,307	Baseline C		st Rem. Cost 50 \$18,307			
	8	Mech. Engineer-	SiDet	100%	\$20,328			50 \$10,307 50 \$20,328			
	12	Research Associa		25%	\$0			50 \$0			
	Not	es									
		the outer screen of the I	barrel. It h	_ olds the re	lative alignme	ent of the bulkhe	ads and provides p	protection for the sta	aves.		
1.1.5.2	22				Barrel out	er screen: fa	hrication	\$75,000			
1.1.0.2	ID	Resource Name	Units	Work	Delay	Start	Finish	·	Danalina Cast		
				VVUIN	Delav	Start	LIHISH	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Wed 3/19/0		Cost /03 \$50,000	Baseline Cost \$0	Act. Cost \$0	Rem. Cost
	1 3						3 Wed 3/19/	/03 \$50,000		\$0 \$0	
	-	FNALEQ FNALCont	0%	0 hrs	0 days	Wed 3/19/0	3 Wed 3/19/	/03 \$50,000	\$0	\$0	\$50,000
	3 Not	FNALEQ FNALCont	0% 0%	0 hrs 0 hrs	0 days 0 days	Wed 3/19/0 Wed 3/19/0	03 Wed 3/19/ 03 Wed 3/19/	/03 \$50,000	\$0	\$0	\$50,000
1.1.5.2	3 Note This is	FNALEQ FNALCont es	0% 0%	0 hrs 0 hrs	0 days 0 days ve buy them	Wed 3/19/0 Wed 3/19/0	03 Wed 3/19/ 03 Wed 3/19/ e them in house.	/03 \$50,000	\$0	\$0	\$50,000
1.1.5.2	3 Note This is	FNALEQ FNALCont es the cost to fabricate the Resource Name	0% 0% screens,	0 hrs 0 hrs - assuming v	0 days 0 days ve buy them	Wed 3/19/0 Wed 3/19/0 rather than make pport tube fa Start	Wed 3/19/ Wed 3/19/ e them in house. abrication Finish	/03 \$50,000 /03 \$25,000 \$135,000 Cost	\$0	\$0 \$0 Act. Cost	\$50,000 \$25,000 Rem. Cost
1.1.5.2	Note This is 2.2.3 ID 1	FNALEQ FNALCont es the cost to fabricate the Resource Name FNALEQ	0% 0% screens, Units	0 hrs 0 hrs assuming v Work 0 hrs	0 days 0 days we buy them Su Delay 0 days	Wed 3/19/0 Wed 3/19/0 rather than make pport tube fa Start Wed 3/19/0	Wed 3/19/ Wed 3/19/ we them in house. abrication Finish Wed 3/19/	\$135,000 Cost \$03 \$90,000	\$0 \$0 Baseline Cost \$0	\$0 \$0 Act. Cost \$0	\$50,000 \$25,000 Rem. Cost \$90,000
1.1.5.2	Note This is 2.2.3	FNALEQ FNALCont es the cost to fabricate the Resource Name	0% 0% screens,	0 hrs 0 hrs - assuming v	0 days 0 days ve buy them Su Delay	Wed 3/19/0 Wed 3/19/0 rather than make pport tube fa Start	Wed 3/19/ Wed 3/19/ we them in house. abrication Finish Wed 3/19/	\$135,000 Cost \$03 \$90,000	\$0 \$0 Baseline Cost	\$0 \$0 Act. Cost	\$50,000 \$25,000 Rem. Cost
1.1.5.2	Note This is 2.2.3 ID 1 3 Note	FNALEQ FNALCont es the cost to fabricate the Resource Name FNALEQ FNALCont es	0% 0% screens, Units 0% 0%	0 hrs 0 hrs assuming v Work 0 hrs 0 hrs	0 days 0 days we buy them Su Delay 0 days 0 days	Wed 3/19/0 Wed 3/19/0 rather than make pport tube fa Start Wed 3/19/0 Wed 3/19/0	Wed 3/19/ Wed 3/19/ We them in house. Abrication Finish Wed 3/19/ Wed 3/19/	\$135,000 Cost \$03 \$90,000 \$45,000	\$0 \$0 Baseline Cost \$0 \$0	\$0 \$0 Act. Cost \$0 \$0	\$50,000 \$25,000 Rem. Cost \$90,000 \$45,000
1.1.5.2	Note This is 2.2.3 ID 1 3 Note	FNALEQ FNALCont es the cost to fabricate the Resource Name FNALEQ FNALCont es	0% 0% screens, Units 0% 0%	0 hrs 0 hrs assuming v Work 0 hrs 0 hrs	0 days 0 days we buy them Su Delay 0 days 0 days	Wed 3/19/0 Wed 3/19/0 rather than make pport tube fa Start Wed 3/19/0 Wed 3/19/0	Wed 3/19/ Wed 3/19/ We them in house. Abrication Finish Wed 3/19/ Wed 3/19/	\$135,000 Cost \$03 \$90,000 \$45,000	\$0 \$0 Baseline Cost \$0 \$0	\$0 \$0 Act. Cost \$0 \$0	\$50,000 \$25,000 Rem. Cost \$90,000
1.1.5.2 1.1.5.2	Note This is 2.2.3 ID 1 3 Note This is	FNALEQ FNALCONT es the cost to fabricate the Resource Name FNALEQ FNALCONT es the equivalent of the spa	0% 0% screens, Units 0% 0% accetube in	O hrs O hrs Work O hrs O hrs	0 days 0 days ve buy them Su Delay 0 days 0 days	Wed 3/19/0 Wed 3/19/0 rather than make pport tube fa Start Wed 3/19/0 Wed 3/19/0	Wed 3/19/ Wed 3/19/ Wed 3/19/ e them in house. Abrication Finish Wed 3/19/ Wed 3/19/ wed 3/19/ wes the distance between	\$135,000 Cost \$03 \$90,000 \$45,000	\$0 \$0 Baseline Cost \$0 \$0	\$0 \$0 Act. Cost \$0 \$0	\$50,000 \$25,000 Rem. Cost \$90,000 \$45,000
	Note This is 2.2.3 ID 1 3 Note This is	FNALEQ FNALCont es the cost to fabricate the Resource Name FNALEQ FNALCont es the equivalent of the spa	0% 0% screens, Units 0% 0% accetube in	O hrs O hrs Work O hrs O hrs Trunlla. It s and Fab Units	0 days 0 days we buy them Su Delay 0 days 0 days supports the l	Wed 3/19/0 Wed 3/19/0 rather than make pport tube fa Start Wed 3/19/0 Wed 3/19/0 barrels and spaneen installation	Wed 3/19/ Wed 3/19/ Wed 3/19/ We them in house. Abrication Finish Wed 3/19/ Wed 3/19/ Wed 3/19/ This the distance between fixture Start	703 \$50,000 703 \$25,000 \$135,000 Cost 703 \$90,000 703 \$45,000 ween the mounts for \$67,555 Finish	\$0 \$0 Baseline Cost \$0 \$0	\$0 \$0 Act. Cost \$0 \$0	\$50,000 \$25,000 Rem. Cost \$90,000 \$45,000
	3 Note This is 2.2.3 ID 1 3 Note This is 2.2.4 ID 1	FNALEQ FNALCont es the cost to fabricate the Resource Name FNALEQ FNALCont es the equivalent of the spa	0% 0% screens, Units 0% 0% accetube in	O hrs O hrs Work O hrs O hrs Units Units	0 days 0 days ve buy them Su Delay 0 days 0 days supports the lay ricate scree Work 0 hrs	Wed 3/19/0 Wed 3/19/0 rather than make pport tube fa Start Wed 3/19/0 Wed 3/19/0 barrels and span een installation Delay 0 days	Wed 3/19/ Wed 3/19/ Wed 3/19/ Wethem in house. Abrication Finish Wed 3/19/ Wed 3/19/ Sthe distance between fixture Start Wed 3/19/03	703 \$50,000 703 \$25,000 \$135,000 Cost 703 \$90,000 703 \$45,000 Ween the mounts for \$67,555 Finish Wed 3/19/03	\$0 \$0 Baseline Cost \$0 \$0	\$0 \$0 Act. Cost \$0 \$0	\$50,000 \$25,000 Rem. Cost \$90,000 \$45,000
	3 Note This is 2.2.3 ID 1 3 Note This is 2.2.4 ID 1 3	FNALEQ FNALCont es the cost to fabricate the Resource Name FNALEQ FNALCont es the equivalent of the spa	0% 0% screens, Units 0% 0% accetube in	O hrs O hrs Work O hrs O hrs Units O%	0 days 0 days ve buy them Su Delay 0 days 0 days supports the laricate scree Work 0 hrs 0 hrs	Wed 3/19/0 Wed 3/19/0 rather than make pport tube fa Start Wed 3/19/0 Wed 3/19/0 barrels and span een installation Delay 0 days 0 days 0 days	Wed 3/19/ Wed 3/19/ Wed 3/19/ Wethem in house. Webrication Finish Wed 3/19/ Wed 3/19/ Webrication Start Wed 3/19/03 Wed 3/19/03	\$135,000 \$135,000 Cost \$03 \$90,000 \$03 \$45,000 ween the mounts for \$67,555 Finish Wed 3/19/03 Wed 3/19/03	\$0 \$0 Baseline Cost \$0 \$0	\$0 \$0 Act. Cost \$0 \$0	\$50,000 \$25,000 Rem. Cost \$90,000 \$45,000
	3 Note This is 2.2.3 ID 1 3 Note This is 2.2.4 ID 1	FNALEQ FNALCont es the cost to fabricate the Resource Name FNALEQ FNALCont es the equivalent of the spa	0% 0% screens, Units 0% 0% accetube in	O hrs O hrs Work O hrs O hrs Units Units	0 days 0 days ve buy them Su Delay 0 days 0 days supports the lay ricate scree Work 0 hrs	Wed 3/19/0 Wed 3/19/0 wather than make pport tube fa Start Wed 3/19/0 wed 3/19/0 warrels and span pen installation Delay 0 days 0 days 0 days	Wed 3/19/ Wed 3/19/ Wed 3/19/ Wethem in house. Abrication Finish Wed 3/19/ Wed 3/19/ Sthe distance between fixture Start Wed 3/19/03	703 \$50,000 703 \$25,000 \$135,000 Cost 703 \$90,000 703 \$45,000 Ween the mounts for \$67,555 Finish Wed 3/19/03	\$0 \$0 Baseline Cost \$0 \$0	\$0 \$0 Act. Cost \$0 \$0	\$50,000 \$25,000 Rem. Cost \$90,000 \$45,000

WBS			Nam	e				С	ost	
"Design and f	Fabı	ricate screen installation fix	kture" co	ntinued						
I	ID	Resource Name	Units	Work	Delay	Sta	art		Finish	
	11	Mech. Technician-SiDet	100%	480 hrs	0 days	Thu 3	/20/03	Th	u 6/12/03	
•	12	Research Associate	50%	240 hrs	0 days	Thu 3	/20/03	Th	u 6/12/03	
1	ID	Resource Name	Units	Cost	Baseline	e Cost	Act. Co	st	Rem. Cost	
	1	FNALEQ	0%	\$10,000		\$0	(\$0	\$10,000	
	3	FNALCont	0%	\$5,000		\$0	(\$0	\$5,000	
	6	Designer-SiDet	100%	\$18,307		\$0	(\$0	\$18,307	
	8	Mech. Engineer-SiDet	100%	\$20,328		\$0	(\$0	\$20,328	
•	11	Mech. Technician-SiDet	100%	\$13,920		\$0	(\$0	\$13,920	
•	12	Research Associate	50%	\$0		\$0	(\$0	\$0	
-	Vote	es								

This fixture holds the barrels and screen while the screen is glued to the bulkheads

1.1.5.2.2.5		Design	and Fabrio	cate supp	oort crac	dle		\$82,555
ID	Resource Name	Units	Work	Delay	Sta	art	F	inish
1	FNALEQ	0%	0 hrs	0 days	Thu 6/	12/03	Thu	6/12/03
3	FNALCont	0%	0 hrs	0 days	Thu 6/	12/03	Thu	6/12/03
6	Designer-SiDet	100%	480 hrs	0 days	Fri 6/	13/03	Мо	n 9/8/03
8	Mech. Engineer-SiDet	100%	480 hrs	0 days	Fri 6/	13/03	Мо	n 9/8/03
11	Mech. Technician-SiDet	100%	480 hrs	0 days	Fri 6/	13/03	Мо	n 9/8/03
12	Research Associate	50%	240 hrs	0 days	Fri 6/	13/03	Мо	n 9/8/03
_ID	Resource Name	Units	Cost	Baselin	e Cost	Act. (Cost	Rem. Cost
1	FNALEQ	0%	\$20,000		\$0		\$0	\$20,000
3	FNALCont	0%	\$10,000		\$0		\$0	\$10,000
6	Designer-SiDet	100%	\$18,307		\$0		\$0	\$18,307
8	Mech. Engineer-SiDet	100%	\$20,328		\$0		\$0	\$20,328
11	Mech. Technician-SiDet	100%	\$13,920		\$0		\$0	\$13,920
12	Research Associate	50%	\$0		\$0		\$0	\$0

Notes

This cradle supports the space tube while the barrels and installed and aligned. It is mounted on roller bearings which ride the rails on the CMM. This allows it to move around during installation of the beampipe and during installation into ISL.

1.1.5.2.3 Layer 0 \$297,745

Notes

This is the Carbon Fiber Support for L0. It is mounted on outer bulkheads and has an integrated cooling system. This includes the structure which supports and cools the hybrids

WBS			Name)			С	ost					
"Layer 0 " con	tinued												
	otes												
ous	ide the end of the barrel.												
1.1.5.2.3.	1			CF Suppo	rt Prototy	/pe: design		\$51,514					
II.	Resource Name	U	Jnits	Work	Delay	Start	Fir	nish	Cost	Baseli	ne Cost	Act. Cost	Rem. Cost
-	B Designer-SiDet	1(00%	640 hrs	0 days	Mon 4/1/02	Tue 7	/23/02	\$24,410		\$0	\$0	\$24,410
8	_	SiDet 10	00%	640 hrs	0 days	Mon 4/1/02	Tue 7	/23/02	\$27,104		\$0	\$0	\$27,104
1	2 Research Associ	ate 5	50%	320 hrs	0 days	Mon 4/1/02	Tue 7	/23/02	\$0		\$0	\$0	\$0
N	otes												
	e assumption is that the L0 outer barrel in z.	CF support str	ructure de	esign starts t	ogether with	the design of th	e bulk hea	d. This inc	ludes the sup	oport sture	cture for the L	.0 hybrids whic	h extend outside
1.1.5.2.3.	2	C	CF Sup	port Proto	type: ma	nufacturing		\$75,000					
II	Resource Name	Units V	Vork	Delay	Start	Fini	sh	Cost	Baseline	e Cost	Act. Cost	Rem. Co	ost
- 2	P FNALR&D	0% C	0 hrs	0 days	Tue 7/23/	02 Tue 7/2	23/02	\$50,000		\$0	\$0	\$50,0	00
3	B FNALCont	0% C	0 hrs	0 days	Tue 7/23/	02 Tue 7/2	23/02	\$25,000		\$0	\$0	\$25,0	00
	otes												
	orication of the first prototype above fabrication is suppo			ucture for L0.									
1.1.5.2.3.	3	CF Supp	ort Pro	ototype: ev	aluation	and testing		\$26,868					
II.	D Resource Name		Units	Work	Delay	Start	F	inish					
	Mech. Engineer-	-SiDet	50%	240 hrs	0 days	Mon 7/7/0	3 Mon	9/29/03	_				
1			100%	480 hrs	0 days	Mon 7/7/0	3 Mon	9/29/03					
1	2 Research Associ	ate	100%	480 hrs	0 days	Mon 7/7/0	3 Mon	9/29/03					
1	3 CMM Programm	er-SiDet	20%	96 hrs	0 days	Mon 7/7/0	3 Mon	9/29/03					
II	Resource Name		Units	Cost	Baseli	ne Cost Ad	t. Cost	Rem. 0	Cost				
	9		50%	\$10,164		\$0	\$0	\$10,					
1			100%	\$13,920		\$0	\$0	\$13,	920				
1			100%	\$0		\$0	\$0		\$0				
1	3 CMM Programm	er-SiDet	20%	\$2,784		\$0	\$0	\$2,	784				
N	otes												

Testing consists of both mechanical and electrical since now pre-production L0 modules are available.

WBS			Nam	ne					Cost	
1.1.5.2.3.4	1		- I GII		CF Supp	ort: Dec	sian		\$19,318	
1.1.3.2.3.		Resource Name	Units	Work	Delay	Sta	•		Finish	
	3	Designer-SiDet	100%	240 hrs	0 days	Mon 8/			n 9/29/03	
3	3	Mech. Engineer-SiDet	100%	240 hrs	0 days	Mon 8/	/18/03	Мо	n 9/29/03	
1.	2	Research Associate	50%	120 hrs	0 days	Mon 8/	/18/03	Мо	n 9/29/03	
10	D	Resource Name	Units	Cost	Baselin	e Cost	Act. C	ost	Rem. Cost	
-6	3	Designer-SiDet	100%	\$9,154		\$0		\$0	\$9,154	_
3	3	Mech. Engineer-SiDet	100%	\$10,164		\$0		\$0	\$10,164	
1.	2	Research Associate	50%	\$0		\$0		\$0	\$0	
	lote	eS the final design for the LO Cf supp	_	ro and the but	orid cupport	etrueturo				

This is the final design for the L0 Cf support structure and the hybrid support structure

.1.5.2.3.5	CF Support: manufacturing									
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1	FNALEQ	0%	0 hrs	0 days	Mon 9/29/03	Mon 9/29/03	\$50,000	\$0	\$0	\$50,000
3	FNALCont	0%	0 hrs	0 days	Mon 9/29/03	Mon 9/29/03	\$25,000	\$0	\$0	\$25,000

As for the prototype we assume 5 months for the production of the CF support structure.

The cost assumes we purchase the structure rather than build it in house.

-	The co	st assumes we purchase the structu	ire rather th	nan build it in l	nouse.				
1.1.5.2.	3.6		С	F Support	: assembl	y and te	est	;	\$50,046
	ID	Resource Name	Units	Work	Delay	Sta	rt	Fi	nish
-	8	Mech. Engineer-SiDet	75%	360 hrs	0 days	Thu 3/	4/04	Thu !	5/27/04
	11	Mech. Technician-SiDet	200%	960 hrs	0 days	Thu 3/	4/04	Thu !	5/27/04
	12	Research Associate	100%	480 hrs	0 days	Thu 3/	4/04	Thu !	5/27/04
	13	CMM Programmer-SiDet	50%	240 hrs	0 days	Thu 3/	4/04	Thu	5/27/04
	ID	Resource Name	Units	Cost	Baselin	e Cost	Act.	Cost	Rem. Cost
-	8	Mech. Engineer-SiDet	75%	\$15,246		\$0		\$0	\$15,246
	11	Mech. Technician-SiDet	200%	\$27,840		\$0		\$0	\$27,840
	12	Research Associate	100%	\$0		\$0		\$0	\$0
	13	CMM Programmer-SiDet	50%	\$6,960		\$0		\$0	\$6,960
	Note	20							

Tests include alignment and cooling tests for hybrid structure and for silicon supports

1.1.5.2.3.7 L0 Supports Complete \$0 L0 Supports Complete

WBS				Nam	ıe				C	Cost					
1.1.5.	.3				Tr	ansportati	ion Fixtı	ures		\$67,636	;				
1	Note	s													
		the fixture for transportir be finished before runi							ble						
1.1.5.3.	.1			transpo	ortation fix	ture: upda	ating de	sign		\$13,552	•				
I	D	Resource Name		Units	Work	Delay	Sta	art	F	inish					
	8	Mech. Engineer-	SiDet	100%	320 hrs	0 days	Thu 1/	15/04	Wed	3/10/04	_				
1	12	Research Associa	ate	50%	160 hrs	0 days	Thu 1/	15/04	Wed	3/10/04					
I	D	Resource Name		Units	Cost	Baselin	e Cost	Act. (Cost	Rem. C	ost				
	8	Mech. Engineer-	SiDet	100%	\$13,552		\$0		\$0	\$13,5	552				
1	12	Research Associa	ate	50%	\$0		\$0		\$0		\$0				
_1	Note	s		_											
Th	is is 1	the labor cost to update	the design	of the Ru	n IIa transpor	tation fixture									
1.1.5.3.	.2			tr	ansportatio	on fixture:	: fabrica	ıtion		\$30,000)				
ı	D	Resource Name	Units	Work	Delay	Start		Finis	sh	Cost		line Cost	Act. (Cost Ren	n. Cost
	1	FNALEQ	0%	0 hrs	0 days	Wed 3/1	0/04 V	Ved 3/	10/04	\$20,00	00	\$0		\$0 \$	20,000
;	3	FNALCont	0%	0 hrs	0 days	Wed 3/1	0/04 V	Ved 3/	10/04	\$10,00	00	\$0		\$0 \$	10,000
١	Note	s													
Th	is is	the cost to refabricate th	ne transpo	rtation fixtu	res.										
1.1.5.3.	.3	t	ranspor	tation fi	kture: final	assembl	ing and	test		\$24,084					
<u>_ I</u>	D	Resource Name		Units	Work	Delay	Sta			nish	Cost	Baseline	Cost	Act. Cost	Rem. Cost
	8	Mech. Engineer-		50%	240 hrs	0 days	Thu 5				\$10,164		\$0	\$0	\$10,164
	11	Mech. Technician		100%	480 hrs	0 days	Thu 5				\$13,920		\$0	\$0	\$13,920
1	12	Research Associa	ate	50%	240 hrs	0 days	Thu 5	/6/04	Fri 7/	/30/04	\$0		\$0	\$0	\$0
	Vote	_		_											
Th	ııs is 1	the labor for assembly o	of the trans	portation fi	xure										
1.1.5.	.4			F	Positioning	ı system (inchwor	ms)		\$62,621					
1	Note	S													

This system allows adjustment of the position of the entire silicon detector (ISL+SVXIIb+L0+ beampipe) relative the the outer tracker (COT) and the beamline.

WBS			Nam	ne				(Cost
1.1.5.	4.1		positi	oning jacks	s(inchwor	ms): desi	gn		\$15,593
	ID	Resource Name	Units	Work	Delay	Sta	rt		Finish
-	6	Designer-SiDet	100%	320 hrs	0 days	Thu 10/	17/02	Fri	12/13/02
	8	Mech. Engineer-SiDet	25%	80 hrs	0 days	Thu 10/	17/02	Fri	12/13/02
	12	Research Associate	50%	160 hrs	0 days	Thu 10/	17/02	Fri	12/13/02
	16	NonFnal Labor	100%	320 hrs	0 days	Thu 10/	17/02	Fri	12/13/02
	ID	Resource Name	Units	Cost	Baselin	e Cost	Act. Co	ost	Rem. Cost
-	6	Designer-SiDet	100%	\$12,205		\$0		\$0	\$12,205
	8	Mech. Engineer-SiDet	25%	\$3,388		\$0		\$0	\$3,388
	12	Research Associate	50%	\$0		\$0		\$0	\$0
	16	NonFnal Labor	100%	\$0		\$0		\$0	\$0
	Note	ne.							

inotes

This is the replacement for the remote positioning system (the inchworms) which attach to the outer flange of ISL and COT. These will be mechanical jacks that can only be adjusted when the plugs are open.

Labor:

design will be done in collaboration with U.Toronto.

1.1.5.4.2		р	ositionin	g jack pro	ototype manufa	ecturing	\$9,000)		
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	FNALR&D	0%	0 hrs	0 days	Fri 12/13/02	Fri 12/13/02	\$6,000	\$0	\$0	\$6,000
3	FNALCont	0%	0 hrs	0 days	Fri 12/13/02	Fri 12/13/02	\$3,000	\$0	\$0	\$3,000

Notes

Cost:

Based on IIa experience

This is the cost of manufacturing the prototype hardware.

This may be covered by U. Toronto depending on a grant.

1.1.5.4.3			_		tioning jack tes		\$0				
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
16	NonFnal Labor	200%	640 hrs	0 days	Thu 2/20/03	Wed 4/16/03	\$0	\$0	\$0	\$0	

Notes

Labor:

This will be done by physicists at Toronto.

Estimated to be 2 FTE.

WBS			Name	Э			(Cost					
1.1.5.4.4			pc	sitioning	jacks: mai	nufacturing		\$30,000					
ID	Resource Name	Units V	Vork	Delay	Start	F	inish	Cost	Bas	seline Cost	Act. Cost	Ren	n. Cost
1	FNALEQ		0 hrs	0 days	Wed 4/16	6/03 Wed	4/16/03	. ,		\$0	\$0		20,000
3	FNALCont	0% (0 hrs	0 days	Wed 4/16	6/03 Wed	4/16/03	\$10,000)	\$0	\$0	\$	10,000
N	otes												
Toro Esit	t: ed on experience with Run onto may cover some of the amte 10k\$ for jacks and 10 tingency is 50%.	costs.	eces to a	ttach to CO	г.								
1.1.5.4.5			positio	ning jacks	s: Assemb	le and test		\$8,028					
<u></u>	Resource Name	I	Units	Work	Delay	Start			Cost	Baseline C	ost Act. (Cost	Rem. Cost
8	3		25%	80 hrs	0 days	Fri 6/13/0			3,388		\$0	\$0	\$3,388
1.			50%	160 hrs	0 days	Fri 6/13/0			1,640		\$0	\$0	\$4,640
12			50%	160 hrs	0 days	Fri 6/13/0		/8/03	\$0		\$0	\$0	\$0
16	NonFnal Labor	2	200%	640 hrs	0 days	Fri 6/13/0	3 Fri 8	/8/03	\$0		\$0	\$0	\$0
Labo This Abo	or: assembly and testing will the labor estimated to be 2 Fine eng, and tech. time will the labor estimated to be 2 Fine eng.	ΓE											
1.1.5.5	,			Installati	on of SVX	IIb into ISL		\$111,105					
	otes												
Sch	se are the fixtures that allow edule: task needs to be done in t		_			ng SVXIIb into	ISL.						
1.1.5.5.1	Design Fixtures	for remov	al of S	VXII and	nstallation	of SVXIIB		\$25,757					
ID	Resource Name	l	Jnits	Work	Delay	Start	F	inish					
6	Designer-SiDet	1	00%	320 hrs	0 days	Thu 1/15/0		3/10/04	_				
8	Mech. Engineer-		00%	320 hrs	0 days	Thu 1/15/0	4 Wed	3/10/04					
12	Research Associa	ate	50%	160 hrs	0 days	Thu 1/15/0	4 Wed	3/10/04					
II			Jnits	Cost	Baseline		t. Cost	Rem. Co					
6	- C			\$12,205		\$0	\$0	\$12,20					
8				\$13,552		\$ 0	\$ 0	\$13,5					
12	Research Associa	ate	50%	\$0		\$0	\$0	;	\$O				

WBS		Naı	ne			Co	ost					
"Design Fixture	es for removal of SV	XII and installat	ion of SVX	(IIB" continu	ued							
	otes edule:											
	task needs to be done in t	time for the removal	of SVXIIa fron	n ISL								
1.1.5.5.2	Fabricate fixtu	ures for SVX re	moval and	installation	of SVXIIb		\$75,000					
ID	Resource Name	Units Work		Start	Fin		Cost	Bas	eline Cost	Act.	Cost Rei	m. Cost
1	FNALEQ	0% 0 hrs		Wed 3/10/			\$50,000		\$0			\$50,000
3	FNALCont	0% 0 hrs	0 days	Wed 3/10/	/04 Wed 3	/10/04	\$25,000		\$0		\$0 5	\$25,000
No	otes											
This	: d on engineering estimate is the cost to purchase the contingency added.		de.									
1.1.5.5.3		uroo for SVV ro	mayal and	inotallation	of CV/VIIIb		¢10 240					
1.1.5.5.3 ID	bly and Test fixton Resource Name	ures for SVA re Unit			Start	Fini	\$10,348	Cost	Baseline C	`oot	Act. Cost	Rem. Cost
8	Mech. Engineer-				Fri 6/4/04	Thu 7/		3,388	Daseille C	\$0	\$0	\$3,388
11	Mech. Techniciar			,	Fri 6/4/04	Thu 7/		,640		\$0	\$0 \$0	\$4,640
12					Fri 6/4/04	Thu 7/		\$0		\$0	\$0	\$0
13	CMM Programme	er-SiDet 509	% 80 hr	s 0 days	Fri 6/4/04	Thu 7/	[′] 1/04 \$2	2,320		\$0	\$0	\$2,320
No	otes											
Labo This	r: involves alignment and as:	sembly of fixtures of	n the cmm at t	Sidet								
		iscribly of fixtures of										
1.1.6			С	ooling and I	Monitoring	\$2	213,238					
	otes				a tha alata stana a	1 (1)		- (D 4 0)	III.(O)			
	task covers the cooling sy cont. is included on all co		g of the coolin	ig and power to	the detectors a	na tne pos	ition monitor	s (RASI	NIKS)			
1.1.6.1				Coolin	ng systems	\$	153,238					
	otes											
This	task covers updating the c	cooling system at Si	det and B0 an	d the cost of ne	ew manifolds at	the detecto	or.					
1.1.6.1.1			Update	Sidet cooli	ng system		\$26,056					
ID	Resource Name	Units	Work	Delay	Start		Finish					
1	FNALEQ	0%		,	Wed 10/16/		ed 10/16/0					
8	Mech. Engineer-	-SiDet 50%	160 hrs	0 days	Thu 10/17/	'02 F	Fri 12/13/0	02				

WBS	Name	Cost

"Update Sidet cooling system" continued

ID	Resource Name	Units	Work	Delay	St	art	Finish
11	Mech. Technician-SiDet	100%	320 hrs	0 days	Thu 1	0/17/02	Fri 12/13/02
12	Research Associate	50%	160 hrs	0 days	Thu 1	0/17/02	Fri 12/13/02
ID	Resource Name	Units	Cost	Baselin	e Cost	Act. Cost	Rem. Cost
1	FNALEQ	0%	\$10,000		\$0	\$0	\$10,000
8	Mech. Engineer-SiDet	50%	\$6,776		\$0	\$0	\$6,776
11	Mech. Technician-SiDet	100%	\$9,280		\$0	\$0	\$9,280
12	Research Associate	50%	\$0		\$0	\$0	\$0

Notes

This is the cooling system that will be used during barrel construction testing of staves.

Labor:

some work is needed to upgrade the existing system.

Mostly a mech tech with some support.

1.1.6	.1.2			Bui	ld interna	I manifold	ls	\$54,084
	ID	Resource Name	Units	Work	Delay	Sta	rt	Finish
	1	FNALEQ	0%	0 hrs	0 days	Wed 10	/16/02	Wed 10/16/02
	3	FNALCont	0%	0 hrs	0 days	Wed 10	/16/02	Wed 10/16/02
	8	Mech. Engineer-SiDet	50%	240 hrs	0 days	Thu 10	/17/02	Wed 1/22/03
	11	Mech. Technician-SiDet	100%	480 hrs	0 days	Thu 10	/17/02	Wed 1/22/03
	12	Research Associate	50%	240 hrs	0 days	Thu 10	/17/02	Wed 1/22/03
	ID	Resource Name	Units	Cost	Baselin	e Cost	Act. Cos	t Rem. Cost
	1	FNALEQ	0%	\$20,000		\$0	\$0	\$20,000
	3	FNALCont	0%	\$10,000		\$0	\$0	\$10,000
	8	Mech. Engineer-SiDet	50%	\$10,164		\$0	\$0	\$10,164
	11	Mech. Technician-SiDet	100%	\$13,920		\$0	\$0	\$13,920
	12	Research Associate	50%	\$0	\$0		\$0	\$0

Notes

These are the manifolds that receive a single cooling line from the slots and connect it to multiple stave circuits.

Cost:

based on IIa experience

Labor:

Needed for testing and assembling of parts.

Moslty a mech. tech. + support.

WBS		Nam	e				C	ost	
1.1.6.1.3	production chiller	compon	ents, mani	folds, con	itrol valv	es		\$73,098	
ID	Resource Name	Units	Work	Delay	Sta	art		Finish	
1	FNALEQ	0%	0 hrs	0 days	Wed 1/	/22/03	We	ed 1/22/03	
3	FNALCont	0%	0 hrs	0 days	Wed 1/	22/03	We	ed 1/22/03	
8	Mech. Engineer-SiDet	50%	280 hrs	0 days	Thu 1/	23/03	We	ed 4/30/03	
11	Mech. Technician-SiDet	100%	560 hrs	0 days	Thu 1/	23/03	We	ed 4/30/03	
12	Research Associate	50%	280 hrs	0 days	Thu 1/	23/03	We	ed 4/30/03	
ID	Resource Name	Units	Cost	Baselin	e Cost	Act. C	ost	Rem. Cost	
1	FNALEQ	0%	\$30,000		\$0		\$0	\$30,000	
3	FNALCont	0%	\$15,000		\$0		\$0	\$15,000	
8	Mech. Engineer-SiDet	50%	\$11,858		\$0		\$0	\$11,858	
11	Mech. Technician-SiDet	100%	\$16,240		\$0		\$0	\$16,240	
12	Research Associate	50%	\$0		\$0		\$0	\$0	
Not	es								
Cost									

These are the costs associated with updating the chillers at B0. The cost is based on an email from Rich Stanek (engineer estimate) in Sept. 01.

Mostly a mech. tech + support.

1.1.6.2 Interlocks \$20,000

Notes

This is the system that montors the power and temperature of the detectors.

It will resue most of the existing system.

1.1.6.2.1					Upgrade	existing systen	n \$30,	000			
I	D	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Thu 2/19/04	Thu 2/19/04	\$15,000	\$0	\$0	\$15,000
;	3	FNALCont	0%	0 hrs	0 days	Thu 2/19/04	Thu 2/19/04	\$15,000	\$0	\$0	\$15,000
1	12	Research Associate	50%	800 hrs	0 days	Fri 2/20/04	Thu 12/2/04	\$0	\$0	\$0	\$0

Notes

Cost:

Physicist estimate.

This is the cost to upgrade the interlock system for Run IIb. additional temperature and current channels will be needed

1.1.6.3 **Position Monitoring** \$30,000

Notes

This is to update the esisting position monitoring system (RASNIK).

Cost is based on Run IIa experience and resuing the DAQ already setup.

Labor:

1.1.6.3.1 Rasnik Prototype manufacturing and test \$0	Not										
ID	there i	s no FNAL labor for this t	ask, Toron	o is taking on	this project						
ID	1.1.6.3.1		Ra	snik Protot	ype manı	ıfacturing and to	est	\$0			
Notes This covers the cost to make and test a Rasnik module. Cost: Toronto will cover some or all of this cost. Labor: assembling and test done at U.Toronto. Estimated to be 1.5 FTE 1.1.6.3.2 ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost 1 FNALEQ 0% 0 hrs 0 days Wed 3/19/03 Wed 3/19/03 \$20,000 \$0 \$0 \$20,000 3 FNALCont 0% 0 hrs 0 days Wed 3/19/03 Wed 3/19/03 \$20,000 \$0 \$0 \$20,000 16 NonFnal Labor 200% 640 hrs 0 days Thu 3/20/03 Wed 5/14/03 \$0 \$0 \$0 \$0 \$0 Notes	ID	Resource Name				_		Cost	Baseline Cost	Act. Cost	Rem. Cost
This covers the cost to make and test a Rasnik module. Cost: Toronto will cover some or all of this cost. Labor: assembling and test done at U.Toronto. Estimated to be 1.5 FTE 1.1.6.3.2 Rasnik Production \$30,000 ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost 1 FNALEQ 0% 0 hrs 0 days Wed 3/19/03 Wed 3/19/03 \$20,000 \$0 \$0 \$20,000 3 FNALCont 0% 0 hrs 0 days Wed 3/19/03 Wed 3/19/03 \$10,000 \$0 \$0 \$0 \$10,000 16 NonFnal Labor 200% 640 hrs 0 days Thu 3/20/03 Wed 5/14/03 \$0 \$0 \$0 \$0 Notes Cost: Cost is based on cost to fabricate additional modules with assembling. Cost/module comes from UCLA experience on IIa. Labor: testing of modules will be done at U.Toronto estimated 2 FTE 1.1.6.3.3 Rasniks Complete \$0 1.1.7 Final Assembly (Installation and Integration) \$673,723 Notes This task covers installation of staves into the barrels, installation of L0 modules on the CF supports and the integration of L0 and beampipe with the outer barrel Added 50% contingency to all costed items	16	NonFnal Labor	150%	1,200 hrs	0 days	Thu 10/17/02	Wed 3/19/03	\$0	\$0	\$0	\$0
Cost: Toronto will cover some or all of this cost. Labor: assembling and test done at U.Toronto. Estimated to be 1.5 FTE 1.1.6.3.2 Rasnik Production \$30,000 ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost 1 FNALEQ 0% 0 hrs 0 days Wed 3/19/03 Wed 3/19/03 \$20,000 \$0 \$0 \$20,000 3 FNALCont 0% 0 hrs 0 days Wed 3/19/03 Wed 3/19/03 \$10,000 \$0 \$0 \$10,000 16 NonFnal Labor 200% 640 hrs 0 days Thu 3/20/03 Wed 5/14/03 \$0 \$0 \$0 \$0 Notes Cost: Cost is based on cost to fabricate additional modules with assembling. Cost/module comes from UCLA experience on IIa. Labor: testing of modules will be done at U.Toronto estimated 2 FTE 1.1.6.3.3 Rasniks Complete \$0 1.1.7 Final Assembly (Installation and Integration) \$673,723 Notes This task covers installation of staves into the barrels, installation of L0 modules on the CF supports and the integration of L0 and beampipe with the outer barrel Added 50% contingency to all costed items	Not	es									
1.1.6.3.2 ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost	Cost: Toron Labor: assen	to will cover some or all of: : nbling and test done at U.	f this cost.	isnik module.							
1 FNALEQ 0% 0 hrs 0 days Wed 3/19/03 Wed 3/19/03 \$20,000 \$0 \$0 \$20,000 3 FNALCont 0% 0 hrs 0 days Wed 3/19/03 Wed 3/19/03 \$10,000 \$0 \$0 \$10,000 16 NonFnal Labor 200% 640 hrs 0 days Thu 3/20/03 Wed 5/14/03 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0						Rasnik Producti	on \$30	,000			
3 FNALCont 0% 0 hrs 0 days Wed 3/19/03 \$10,000 \$0 \$0 \$10,000 16 NonFnal Labor 200% 640 hrs 0 days Thu 3/20/03 Wed 5/14/03 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0	ID	Resource Name	Unite	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
Notes Cost: Cost is based on cost to fabricate additional modules with assembling. Cost/module comes from UCLA experience on IIa. Labor: testing of modules will be done at U.Toronto estimated 2 FTE 1.1.6.3.3 Rasniks Complete \$0 1.1.7 Final Assembly (Installation and Integration) Notes This task covers installation of staves into the barrels, installation of L0 modules on the CF supports and the integration of L0 and beampipe with the outer barrel Added 50% contingency to all costed items		11030dice Hairie	Offica	****		- 10					
Notes Cost: Cost is based on cost to fabricate additional modules with assembling. Cost/module comes from UCLA experience on IIa. Labor: testing of modules will be done at U.Toronto estimated 2 FTE 1.1.6.3.3 Rasniks Complete \$0 1.1.7 Final Assembly (Installation and Integration) \$673,723 Notes This task covers installation of staves into the barrels, installation of L0 modules on the CF supports and the integration of L0 and beampipe with the outer barrel Added 50% contingency to all costed items	1	FNALEQ	0%	0 hrs	0 days	Wed 3/19/03	Wed 3/19/03	\$20,000	\$0		\$20,000
Cost: Cost is based on cost to fabricate additional modules with assembling. Cost/module comes from UCLA experience on IIa. Labor: testing of modules will be done at U.Toronto estimated 2 FTE 1.1.6.3.3 Rasniks Complete \$0 1.1.7 Final Assembly (Installation and Integration) \$673,723 Notes This task covers installation of staves into the barrels, installation of L0 modules on the CF supports and the integration of L0 and beampipe with the outer barrel Added 50% contingency to all costed items	1 3	FNALEQ FNALCont	0% 0%	0 hrs 0 hrs	0 days 0 days	Wed 3/19/03 Wed 3/19/03	Wed 3/19/03 Wed 3/19/03	\$20,000 \$10,000	\$0 \$0	\$0	\$20,000 \$10,000
1.1.7 Final Assembly (Installation and Integration) \$673,723 Notes This task covers installation of staves into the barrels, installation of L0 modules on the CF supports and the integration of L0 and beampipe with the outer barrel Added 50% contingency to all costed items	1 3 16	FNALEQ FNALCont NonFnal Labor	0% 0%	0 hrs 0 hrs	0 days 0 days	Wed 3/19/03 Wed 3/19/03	Wed 3/19/03 Wed 3/19/03	\$20,000 \$10,000	\$0 \$0	\$0	\$20,000 \$10,000
Notes This task covers installation of staves into the barrels, installation of L0 modules on the CF supports and the integration of L0 and beampipe with the outer barrel Added 50% contingency to all costed items	1 3 16 Not Cost: Cost: Cost/t Labor testing	FNALEQ FNALCont NonFnal Labor es s based on cost to fabrica module comes from UCLA g of modules will be done	0% 0% 200% ate additional experience	0 hrs 0 hrs 640 hrs al modules with e on IIa.	0 days 0 days 0 days	Wed 3/19/03 Wed 3/19/03 Thu 3/20/03	Wed 3/19/03 Wed 3/19/03	\$20,000 \$10,000	\$0 \$0	\$0	\$20,000 \$10,000
and the integration of L0 and beampipe with the outer barrel Added 50% contingency to all costed items	1 3 16 Not Cost: Cost is Cost/r Labor testing estima 1.1.6.3.3	FNALEQ FNALCont NonFnal Labor es s based on cost to fabrica module comes from UCLA g of modules will be done	0% 0% 200% ate additional experience at U.Toronal	0 hrs 0 hrs 640 hrs al modules with e on IIa.	0 days 0 days 0 days n assembling	Wed 3/19/03 Wed 3/19/03 Thu 3/20/03	Wed 3/19/03 Wed 3/19/03 Wed 5/14/03	\$20,000 \$10,000 \$0	\$0 \$0	\$0	\$20,000 \$10,000
A A 7 A Character (Out of Control	1 3 16 Not Cost: Cost is Costributed testing estimates 1.1.6.3.3	FNALEQ FNALCont NonFnal Labor Ses s based on cost to fabrica module comes from UCLA sign of modules will be done ated 2 FTE	0% 0% 200% ate additional experience at U.Toronal	0 hrs 0 hrs 640 hrs al modules with e on IIa.	0 days 0 days 0 days n assembling	Wed 3/19/03 Wed 3/19/03 Thu 3/20/03	Wed 3/19/03 Wed 3/19/03 Wed 5/14/03	\$20,000 \$10,000 \$0	\$0 \$0	\$0	\$20,000 \$10,000
	1 3 16 Not Cost: Cost is Costributed testing estima 1.1.6.3.3 1.1.7 Not This tand the	FNALEQ FNALCont NonFnal Labor Ses Ses based on cost to fabricate anodule comes from UCLA Ses of modules will be done ated 2 FTE Ses ses covers installation of ses integration of L0 and both	0% 0% 200% ate additional A experience at U.Toronal Staves into eampipe wi	0 hrs 0 hrs 640 hrs al modules with e on Ila. Assembly (the barrels, insent the outer ba	0 days 0 days 0 days n assembling Installatio	Wed 3/19/03 Wed 3/19/03 Thu 3/20/03 g. Rasniks Comple on and Integration	Wed 3/19/03 Wed 3/19/03 Wed 5/14/03	\$20,000 \$10,000 \$0	\$0 \$0	\$0	\$20,000 \$10,000

WBS			Nan	06					Cost	
1.1.7.1	1			e stave ins	tallation :	fivtura: E	28.0		\$70,757	
_	ID	Resource Name	Units	Work	Delay	Sta	rt		Finish	
	2	FNALR&D	0%	0 hrs	0 days	Fri 5/2	24/02	F	ri 5/24/02	
	3	FNALCont	0%	0 hrs	0 days	Fri 5/2	24/02	F	ri 5/24/02	
	6	Designer-SiDet	50%	320 hrs	0 days	Tue 5/2	28/02	We	d 9/18/02	
	8	Mech. Engineer-SiDet	50%	320 hrs	0 days	Tue 5/2	28/02	We	d 9/18/02	
	12	Research Associate	50%	320 hrs	0 days	Tue 5/2	28/02	We	d 9/18/02	
	ID	Resource Name	Units	Cost	Baselin	e Cost	Act. 0	Cost	Rem. Cost	
_	2	FNALR&D	0%	\$30,000		\$0		\$0	\$30,000	_
	3	FNALCont	0%	\$15,000		\$0		\$0	\$15,000	
	6	Designer-SiDet	50%	\$12,205		\$0		\$0	\$12,205	
	8	Mech. Engineer-SiDet	50%	\$13,552		\$0		\$0	\$13,552	
	12	Research Associate	50%	\$0		\$0		\$0	\$0	
	Note	es								
T	his is	all the r&d needed to prototype to	he installatio	n and alignm	ent of staves	s in the out	er barrel			

1.1.7.	.1.2		St	ave install	ation fixtu	ıres: de	sign		\$18,981
	ID	Resource Name	Units	Work	Delay	St	art		Finish
•	6	Designer-SiDet	100%	320 hrs	0 days	Mon 1	2/16/02	We	d 2/19/03
	8	Mech. Engineer-SiDet	50%	160 hrs	0 days	Mon 1	2/16/02	We	d 2/19/03
	12	Research Associate	50%	160 hrs	0 days	Mon 1	2/16/02	We	d 2/19/03
	ID	Resource Name	Units	Cost	Baselin	e Cost	Act. Cos	st	Rem. Cost
•	6	Designer-SiDet	100%	\$12,205		\$0	\$	0	\$12,205
	8	Mech. Engineer-SiDet	50%	\$6,776		\$0	\$	0	\$6,776
	12	Research Associate	50%	\$0		\$0	\$	0	\$0

Notes

Final Stave installation fixture design will start as soon as the final bulk-head design is finished and the R&D is completed.

1.1.7.	1.3			Stave	installation	\$105,000						
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
_	1	FNALEQ	0%	0 hrs	0 days	Wed 2/19/03	Wed 2/19/03	\$70,000	\$0	\$0	\$70,000	
	3	FNALCont	0%	0 hrs	0 days	Wed 2/19/03	Wed 2/19/03	\$35,000	\$0	\$0	\$35,000	

Notes

These fixtures are larger than Run IIa and thus will be more expensive. Cost is estijmated from RunIIa costs (50k)

WDO								
WBS		Name) 			C	ost	
1.1.7.1.4	Stave in	stallatior	n fixture: s	etup and <i>i</i>	Alignment		\$21,635	
ID	Resource Name	Units	Work	Delay	Start	F	inish	
8	Mech. Engineer-SiDet	25%	100 hrs	0 days	Thu 5/15/03	Fri	7/25/03	
11	Mech. Technician-SiDet	100%	400 hrs	0 days	Thu 5/15/03	Fri	7/25/03	
12	Research Associate	25%	100 hrs	0 days	Thu 5/15/03	Fri	7/25/03	
13	CMM Programmer-SiDet	50%	200 hrs	0 days	Thu 5/15/03	Fri	7/25/03	
ID	Resource Name	Units	Cost	Baselin			Rem. Cos	
8	Mech. Engineer-SiDet	25%	\$4,235		\$0	\$0	\$4,235	
11	Mech. Technician-SiDet	100%	\$11,600		\$0	\$0	\$11,600	
12	Research Associate	25%	\$0		\$0	\$0	\$0	
13	CMM Programmer-SiDet	50%	\$5,800		\$0	\$0	\$5,800)
Note								
This w	rill be setup on a CMM and mechanic	al staves w	vill be used to	test the insta	allation procedures	S.		
1.1.7.1.5		Bulkhe	ad installa	tion and a	alignment		\$10,974	
ID	Resource Name	Units	Work	Delay	Start		inish	
8	Mech. Engineer-SiDet	25%	40 hrs	0 days	Tue 9/9/03		10/6/03	
11	Mech. Technician-SiDet	100%	160 hrs	0 days	Tue 9/9/03		10/6/03	
12	Research Associate	50%	80 hrs	0 days	Tue 9/9/03		10/6/03	
13	CMM Programmer-SiDet	100%	160 hrs	0 days	Tue 9/9/03	Mon	10/6/03	
ID	Resource Name	Units	Cost	Baseline			Rem. Cost	_
8	Mech. Engineer-SiDet	25%	\$1,694		\$0	\$0	\$1,694	
11	Mech. Technician-SiDet	100%	\$4,640		\$0	\$0	\$4,640	
12	Research Associate	50%	\$0		\$0	\$0	\$0	
13	CMM Programmer-SiDet	100%	\$4,640		\$0	\$0	\$4,640	
Note								
Bulkhe	eads must be precisely aligned to each	h other and	d to the CMM	reference sy	/stem.			
1.1.7.1.6			Doody f	or otovo i	ootollotion		\$0	
1.1.7.1.0			Reauy II	Ji Stave II	nstallation		φυ	
1.1.7.1.7			Ir	stallation	of staves		\$57,282	
_ID	Resource Name	Units	Work	Delay			Finish	
8	Mech. Engineer-SiDet	10%	120 hrs	,			hu 9/23/04	
	A4 T O'D /	100%	1,200 hrs	0 days	Tue 2/24/0	и т	h 0/22/04	
11	Mech. Technician-SiDet						hu 9/23/04	
11 12 13	Research Associate CMM Programmer-SiDet	75% 50%	900 hrs	o days	Tue 2/24/0)4 T	hu 9/23/04 hu 9/23/04 hu 9/23/04	

WBS			Name)		С	ost
"Installatio	n of st	aves" continued					
motanano	ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost
	8	Mech. Engineer-SiDet	10%	\$5,082	\$0	\$0	\$5,082
	11	Mech. Technician-SiDet	100%	\$34,800	\$0	\$0	\$34,800
	12	Research Associate	75%	\$0	\$0	\$0	\$0
	13	CMM Programmer-SiDet	50%	\$17,400	\$0	\$0	\$17,400
	Not	00					

Notes

Labor:

estimated based on runII experience.

Installing and aligning/measuring staves should be a rather fast task. We foresee that it will be done in batches (i.e. wait for a certain number of staves to be ready for installation and the install them).

This is a task that spans the 200 days of stave production but in reality it takes less then 200 days to be accomplished.

We assume that the labor is required for 3/4 of the available time (i.e. 3/4*200 = 150 days worth of labor)

1.1.7.	1.8		Ins	tallation of S	Stave: ele	ctrical testing	\$0)				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	12	Research Associate	150%	1,800 hrs	0 days	Tue 3/16/04	Thu 10/14/04	\$0	\$0	\$0	\$0	
	15	Scientist	25%	300 hrs	0 days	Tue 3/16/04	Thu 10/14/04	\$0	\$0	\$0	\$0	
	Note	es										

Labor:

This is ALL the electrical testing crew at FNAL. We don't divide it up between hybrid, modules, staves and burn-in stave parts. All SiDet electrical testing (up to the Stave) is considered here in terms of labor. It is estimated to be a total of 4 FTE postdocs + 1 FTE scientist + 0.5 FTE electrical technician (for repair).

This is a task that spans the 200 days of stave production but in reality it takes less then 200 days to be accomplished.

We conservatively assume that testing labor is required during the entire assembling time.

1.1.7.	1.9			Stave	installatio	n com	plete		\$0
1.1.7.1.	.10				Final s	/stem	tests	\$17	',704
	ID	Resource Name	Units	Work	Delay	;	Start	Fin	ish
_	7	Elect. Engineer	50%	80 hrs	0 days	Tue	12/21/04	Wed 1	/26/05
	8	Mech. Engineer-SiDet	50%	80 hrs	0 days	Tue	12/21/04	Wed 1	/26/05
	9	Elect. Technician	25%	40 hrs	0 days	Tue	12/21/04	Wed 1	/26/05
	11	Mech. Technician-SiDet	200%	320 hrs	0 days	Tue	12/21/04	Wed 1	/26/05
	12	Research Associate	400%	640 hrs	0 days	Tue	12/21/04	Wed 1	/26/05
	15	Scientist	100%	160 hrs	0 days	Tue	12/21/04	Wed 1	/26/05
	ID	Resource Name	Units	Cost	Baseline	Cost	Act. Cos	st Ren	n. Cost
_	7	Elect. Engineer	50%	\$4,076		\$0	\$	0	\$4,076
	8	Mech. Engineer-SiDet	50%	\$3,388		\$0	\$	0	\$3,388

WBS	Name	Cost	
"Final system tests" continued			
ID Resource Nar	ne Units Cost Ba	aseline Cost Act Cost Rem Cost	

ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost
9	Elect. Technician	25%	\$960	\$0	\$0	\$960
11	Mech. Technician-SiDet	200%	\$9,280	\$0	\$0	\$9,280
12	Research Associate	400%	\$0	\$0	\$0	\$0
15	Scientist	100%	\$0	\$0	\$0	\$0

Notes

This is the final system test. Goal should be to establish that all staves are working, cooling is working and everything is aligned to specs.

1.1.7.1.	11			Inst	allation o	uter screen	\$6,334				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	8	Mech. Engineer-SiDet	25%	40 hrs	0 days	Thu 1/13/05	Wed 2/9/05	\$1,694	\$0	\$0	\$1,694
	11	Mech. Technician-SiDet	100%	160 hrs	0 days	Thu 1/13/05	Wed 2/9/05	\$4,640	\$0	\$0	\$4,640
	12	Research Associate	50%	80 hrs	0 days	Thu 1/13/05	Wed 2/9/05	\$0	\$0	\$0	\$0

Notes

Schedule:

based on the time required for the iia silicon system

1.1.7.1.1	2		Inst	allation of	f barrel in	spacetu	ube		\$5,174
II	D	Resource Name	Units	Work	Delay	Sta	art		Finish
-8	8	Mech. Engineer-SiDet	50%	40 hrs	0 days	Thu 2/	10/05	We	d 2/23/05
1	1	Mech. Technician-SiDet	100%	80 hrs	0 days	Thu 2/	10/05	We	d 2/23/05
1	2	Research Associate	50%	40 hrs	0 days	Thu 2/	10/05	We	d 2/23/05
1	3	CMM Programmer-SiDet	50%	40 hrs	0 days	Thu 2/	10/05	We	d 2/23/05
	D	Resource Name	Units	Cost	Baselin	e Cost	Act.	Cost	Rem. Cost
-	8	Mech. Engineer-SiDet	50%	\$1,694		\$0		\$0	\$1,694
1	1	Mech. Technician-SiDet	100%	\$2,320		\$0		\$0	\$2,320
1	2	Research Associate	50%	\$0		\$0		\$0	\$0
1	3	CMM Programmer-SiDet	50%	\$1,160		\$0		\$0	\$1,160

Notes

Schedule:

based on the time required for the iia silicon system

The barrels are placed in the space tube and then aligned.

WBS		Nam	е				Cost	
1.1.7.1.13			dressing o	of cables	and cooling		\$4,014	
ID	Resource Name	Units	Work	Delay	Start		Finish	
8	Mech. Engineer-SiDet	50%	40 hrs	0 days	Thu 2/10/	05 V	/ed 2/23/05	
11	Mech. Technician-SiDet	100%	80 hrs	0 days	Thu 2/10/	05 V	/ed 2/23/05	
12	Research Associate	200%	160 hrs	0 days	Thu 2/10/	05 V	/ed 2/23/05	
ID	Resource Name	Units	Cost	Baseline	Cost Act	t. Cost	Rem. Cost	
8	Mech. Engineer-SiDet	50%	\$1,694		\$0	\$0	\$1,694	_
11	Mech. Technician-SiDet	100%	\$2,320		\$0	\$0	\$2,320	
12	Research Associate	200%	\$0		\$0	\$0	\$0	
Note	es							
Schedu		on system						
1.1.7.1.14			Oute	r Detecto	r Complete		\$ 0	
1.1.7.2				0 14-11-	ition (Inner)		\$150,645	

1.1	.7.2			l	_0 Installa	ation (In	ner)		\$150,645
1.1.7	.2.1		L0 mo	dule install	ation fixt	ures: de	sign		\$25,757
	ID	Resource Name	Units	Work	Delay	Sta	art		Finish
	6	Designer-SiDet	100%	320 hrs	0 days	Wed 7	//24/02	We	ed 9/18/02
	8	Mech. Engineer-SiDet	100%	320 hrs	0 days	Wed 7	//24/02	We	ed 9/18/02
	ID	Resource Name	Units	Cost	Baselin	e Cost	Act. C	ost	Rem. Cost
	6	Designer-SiDet	100%	\$12,205		\$0		\$0	\$12,205
	8	Mech. Engineer-SiDet	100%	\$13,552		\$0		\$0	\$13,552

Notes

This is the time estimated from Run IIa experience

1.1.7.2	2.2		L0	module	installation	on fixtures: fabri	ication	\$60,000			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
_	1	FNALEQ	0%	0 hrs	0 days	Wed 9/18/02	Wed 9/18/02	\$40,000	\$0	\$0	\$40,000
	3	FNALCont	0%	0 hrs	0 days	Wed 9/18/02	Wed 9/18/02	\$20,000	\$0	\$0	\$20,000

Notes

Cost:

2 fixtures at 20k each based on experience with Run iia I00 design

WBS			Nam	Δ			Cost				
	7.2.3	I 0 module			e. accom	bly and test	\$6,33 ⁴	1			
1.1.	1.2.3 ID	Resource Name	Units	Work	Delay	Start	φο,33. Finish	+			
	8	Mech. Engineer-SiDet	25%	40 hrs	0 days	Mon 12/16/0		/03			
	11	Mech. Technician-SiDet	100%	160 hrs	0 days	Mon 12/16/0					
	ID	Resource Name	Units	Cost	Baseline						
	8	Mech. Engineer-SiDet	25%	\$1,694	Dasciiii	\$0	\$0 \$1,6				
	11	Mech. Technician-SiDet	100%	\$4,640		\$0 \$0	\$0 \$4,6				
			10070	Ψ1,010		ΨΟ	Ψ0 Ψ1,0	, 10			
	Not This to	es ask involves testing installation and a	alianment r	rocedures I	t is based o	n Run IIa evnerier	ce with LOO				
		ask involves testing installation and a									
1.1.	7.2.4		In	stall L0 su	pports on	beam pipe	\$9,722	2			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	8	Mech. Engineer-SiDet	75%	120 hrs	0 days	Fri 5/28/04	Thu 6/24/04	\$5,082	\$0	\$0	\$5,082
	11	Mech. Technician-SiDet	100%	160 hrs	0 days	Fri 5/28/04	Thu 6/24/04	\$4,640	\$0	\$0	\$4,640
	12	Research Associate	50%	80 hrs	0 days	Fri 5/28/04	Thu 6/24/04	\$0	\$0	\$0	\$0
	Not										
		es are stand offs between the beampip	e and the i	nner surface	of L0. They	may not be need	ed.				
1.1.			e and the i			may not be need L0 Modules	ed. \$6,38 °				
1.1.	these		e and the i					1 Cost	Baseline Cost	Act. Cost	Rem. Cost
1.1.	these a	are stand offs between the beampip		Insta	llation of	L0 Modules Start	\$6,38 ⁷ Finish	Cost	Baseline Cost \$0	Act. Cost	Rem. Cost \$813
1.1.	7.2.5 ID 8 11	Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet	Units 10% 100%	Insta Work 19.2 hrs 192 hrs	llation of Delay 0 days 0 days	L0 Modules Start Fri 6/25/04 Fri 6/25/04	\$6,38 ⁻ Finish Thu 7/29/04 Thu 7/29/04	Cost \$813 \$5,568	\$0 \$0	\$0 \$0	\$813 \$5,568
1.1.	7.2.5 ID 8	Resource Name Mech. Engineer-SiDet	Units 10%	Insta Work 19.2 hrs	llation of Delay 0 days	L0 Modules Start Fri 6/25/04 Fri 6/25/04	\$6,38 ⁻ Finish Thu 7/29/04 Thu 7/29/04	Cost \$813	\$0	\$0	\$813
1.1.	7.2.5 ID 8 11	Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate	Units 10% 100%	Insta Work 19.2 hrs 192 hrs	llation of Delay 0 days 0 days	L0 Modules Start Fri 6/25/04 Fri 6/25/04	\$6,38 ⁻ Finish Thu 7/29/04 Thu 7/29/04	Cost \$813 \$5,568	\$0 \$0	\$0 \$0	\$813 \$5,568
1.1.	7.2.5 ID 8 11 12 Not we exp	Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate es Dect to do at least 3 modules/day: 14	Units 10% 100% 100%	Instal Work 19.2 hrs 192 hrs 192 hrs	llation of Delay 0 days 0 days	L0 Modules Start Fri 6/25/04 Fri 6/25/04	\$6,38 ⁻ Finish Thu 7/29/04 Thu 7/29/04	Cost \$813 \$5,568	\$0 \$0	\$0 \$0	\$813 \$5,568
	7.2.5 ID 8 11 12 Not we exp	Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate	Units 10% 100% 100%	Instal Work 19.2 hrs 192 hrs 192 hrs	llation of Delay 0 days 0 days 0 days 0 days	L0 Modules Start Fri 6/25/04 Fri 6/25/04	\$6,38 ⁻ Finish Thu 7/29/04 Thu 7/29/04	Cost \$813 \$5,568 \$0	\$0 \$0	\$0 \$0	\$813 \$5,568
	7.2.5 ID 8 11 12 Not we exp based	Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate es Dect to do at least 3 modules/day: 14	Units 10% 100% 100%	Instal Work 19.2 hrs 192 hrs 192 hrs	llation of Delay 0 days 0 days 0 days 0 days	L0 Modules Start Fri 6/25/04 Fri 6/25/04	\$6,38 Finish Thu 7/29/04 Thu 7/29/04 Thu 7/29/04	Cost \$813 \$5,568 \$0	\$0 \$0 \$0	\$0 \$0 \$0	\$813 \$5,568
	7.2.5 ID 8 11 12 Not we exp based 7.2.6	Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate es Dect to do at least 3 modules/day: 14 on Run iia experience with L00	Units 10% 100% 100%	Instal Work 19.2 hrs 192 hrs 192 hrs = 24 days Work	Delay O days O days O days O days Dress Delay	L0 Modules Start Fri 6/25/04 Fri 6/25/04 Fri 6/25/04	\$6,38° Finish Thu 7/29/04 Thu 7/29/04 Thu 7/29/04	Cost \$813 \$5,568 \$0	\$0 \$0 \$0	\$0 \$0 \$0	\$813 \$5,568 \$0
	7.2.5 ID 8 11 12 Not we exp based 7.2.6 ID	Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate es Dect to do at least 3 modules/day: 14 on Run iia experience with L00	Units 10% 100% 100% 14 modules Units	Instal Work 19.2 hrs 192 hrs 192 hrs = 24 days Work 8 hrs	Delay O days O days O days O days Dress Delay	L0 Modules Start Fri 6/25/04 Fri 6/25/04 Fri 6/25/04 sing of HDIs Start	\$6,38° Finish Thu 7/29/04 Thu 7/29/04 Thu 7/29/04 \$2,650 Finish	Cost \$813 \$5,568 \$0 Cost	\$0 \$0 \$0	\$0 \$0 \$0	\$813 \$5,568 \$0 Rem. Cost
	7.2.5 ID 8 11 12 Not we exp based 7.2.6 ID 8	Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate es Dect to do at least 3 modules/day: 14 on Run iia experience with L00 Resource Name Mech. Engineer-SiDet	Units 10% 100% 100% 4 modules Units 10%	Instal Work 19.2 hrs 192 hrs 192 hrs = 24 days Work 8 hrs 80 hrs	Delay 0 days 0 days 0 days Dress Delay 0 days	L0 Modules	\$6,38° Finish Thu 7/29/04 Thu 7/29/04 Thu 7/29/04 \$2,659 Finish Thu 8/12/04	Cost \$813 \$5,568 \$0 Cost \$339	\$0 \$0 \$0 Baseline Cost \$0	\$0 \$0 \$0 Act. Cost	\$813 \$5,568 \$0 Rem. Cost \$339
	7.2.5 ID 8 11 12 Not we exp based 7.2.6 ID 8 11	Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate es Dect to do at least 3 modules/day: 14 on Run iia experience with L00 Resource Name Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate	Units 10% 100% 100% Units 10% 10%	Instal Work 19.2 hrs 192 hrs 192 hrs = 24 days Work 8 hrs 80 hrs	Delay 0 days 0 days 0 days Dress Delay 0 days 0 days	Start Fri 6/25/04 Fri 6/25/04 Fri 6/25/04 Fri 6/25/04 Sing of HDIs Start Fri 7/30/04 Fri 7/30/04	\$6,38° Finish Thu 7/29/04 Thu 7/29/04 Thu 7/29/04 \$2,659 Finish Thu 8/12/04 Thu 8/12/04	Cost \$813 \$5,568 \$0 Cost \$339 \$2,320	\$0 \$0 \$0 Baseline Cost \$0 \$0	\$0 \$0 \$0 Act. Cost \$0 \$0	\$813 \$5,568 \$0 Rem. Cost \$339 \$2,320

WBS			Nan	ne			Cost				
1.1.7.2	2.7				L0 Sy	/stem Tests	\$31,2	30			
1	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	7	Elect. Engineer	50%	240 hrs	0 days	Fri 7/30/04	Fri 10/22/04	\$12,228	\$0	\$0	\$12,228
	8	Mech. Engineer-SiDet	25%	120 hrs	0 days	Fri 7/30/04	Fri 10/22/04		\$0	\$0	\$5,082
	11	Mech. Technician-SiDet	100%	480 hrs	0 days	Fri 7/30/04	Fri 10/22/04		\$0	\$0	\$13,920
	12	Research Associate	200%	960 hrs	0 days	Fri 7/30/04	Fri 10/22/04		\$0	\$0	\$0
•	15	Scientist	100%	480 hrs	0 days	Fri 7/30/04	Fri 10/22/04	\$0	\$0	\$0	\$0
	Note										
Th	hese	tests will determine final grounding	and shield	ding							
1.1.7.2	2.8			lr	nstallation	of Screens	\$8,5	62			
I	ID	Resource Name	Units	Work	Delay	Start	Finish	1			
	8	Mech. Engineer-SiDet	100%	120 hrs	0 days	Mon 10/25/0					
	11	Mech. Technician-SiDet	100%	120 hrs	0 days	Mon 10/25/0					
•	12	Research Associate	100%	120 hrs	0 days	Mon 10/25/0	04 Fri 11/12	2/04			
	ID	Resource Name	Units	Cost	Baseline						
	8	Mech. Engineer-SiDet	100%	\$5,082		\$0		,082			
	11	Mech. Technician-SiDet	100%	\$3,480		\$0		480			
•	12	Research Associate	100%	\$0		\$0	\$0	\$0			
	Note										
Th	his re	presents an additional electrical sh	ield aroun	d L0.							
1.1.7.2	2.9			Inne	er Detecto	r Complete		\$ 0			
1.1.7	7.3					Integration	\$205,2	24			
	Note	25				g.a	Ψ=00,=				
		sk incudes the fixtures and labor a	ssociated	with installing	the inner de	tector (L0) into the	e outer barrel. All	costs and labor	are estimated based of	on Run IIa exper	ience
1.1.7.3		Prototype Inn					\$12,8				
I	ID	Resource Name	Units	Work	Delay	Start	Finish				
	6	Designer-SiDet	25%	160 hrs	0 days	Mon 8/18/03	Wed 12/10	/03			
	8	Mech. Engineer-SiDet	25%	160 hrs	0 days	Mon 8/18/03	Wed 12/10				
•	12	Research Associate	25%	160 hrs		Mon 8/18/03	Wed 12/10	/03			
1	ID	Resource Name	Units	Cost	Baseline	Cost Act. C	ost Rem. C	ost			
_	6	Designer-SiDet	25%	\$6,102		\$0	\$0 \$6,1	02			
	8	Mech. Engineer-SiDet	25%	\$6,776		\$0	\$0 \$6,7	76			

WBS			Nam	ıe				Cost				
	Inner	Detector Installation Fixture			ued							
riototypo	ID	Resource Name	Units	Cost	Baseline C	ost Act.	Cost	Rem.	Cost			
	12	Research Associate	25%	\$0		\$0	\$0		\$0			
	Note	es										
	These	are the fixtures for installing the inn	er detecto	rs into the ou	iter svxiib barre	l.						
1.1.7	.3.2	Prototype Inner De	etector I	nstallation	n Fixtures: f	abrication		\$30.	,000			
	ID	Resource Name Units	Work	Delay	Start		Finish)	Cost	Baseline Cost	Act. Cost	Rem. Cost
	2	FNALR&D 0%	0 hrs	0 days	Wed 12/10		d 12/1		\$20,000	\$0	\$0	\$20,000
	3	FNALCont 0%	0 hrs	0 days	Wed 12/10	0/03 We	d 12/1	0/03	\$10,000	\$0	\$0	\$10,000
	Note	es										
	Cost: Price is	s based on L00 installation fixtures										
								^				
1.1.7		• •			tallation Fix				,761			
	<u>ID</u>	Resource Name Mech. Engineer-SiDet	Units 25%	Work 60 hrs	Delay 0 days	Start Thu 3/18/	/O.4 \	Finis Ved 4/2				
	8 11	Mech. Technician-SiDet	50%	120 hrs	,	Thu 3/18/		Ved 4/2 Ved 4/2				
	12	Research Associate	50%	120 hrs		Thu 3/18/		Ved 4/2				
	13	CMM Programmer-SiDet	25%	60 hrs	0 days	Thu 3/18/	′04 V	Ved 4/2	28/04			
	ID	Resource Name	Units	Cost	Baseline	Cost Ac	t. Cost	t Rem	n. Cost			
	8	Mech. Engineer-SiDet	25%	\$2,541		\$0	\$0		\$2,541			
	11	Mech. Technician-SiDet	50%	\$3,480		\$0 \$0	\$0		\$3,480			
	12 13	Research Associate CMM Programmer-SiDet	50% 25%	\$0 \$1,740		\$0 \$0	\$0 \$0		\$0 \$1,740			
		· ·	2570	Ψ1,740		ΨΟ	Ψ	,	ψ1,740			
	Note This te	es st is setup on a CMM and the align	ment is tes	sted								
								•				
1.1.7					Fixtures: Fin	•		\$33,		. 5 ! 6		
	ID	Resource Name	Units	Work	Delay	Start	и г	Finish	Co:			
	6 8	Designer-SiDet Mech. Engineer-SiDet	100% 75%	480 hrs 360 hrs		Thu 4/29/0 Thu 4/29/0		ri 7/23/0 ri 7/23/0			\$0 \$0	\$0 \$18,307 \$0 \$15,246
	12	Research Associate	50%	240 hrs		Thu 4/29/0		ri 7/23/0		\$0	\$0 \$0	\$0 \$0
	Note	26			-							

Notes
This covers the redesign/ adjustments to the prototype fixtures

WBS				Nam	e				Co	st			
1.1.7.	3.5		Inner De	etector I	nstallation	Fixtures:	fabrica	tion	\$	30,000			
	ID	Resource Name	Units	Work	Delay	Start	F	inish	Co	ost E	Baseline Cost	Act. Cost	Rem. Cost
-	1	FNALEQ	0%	0 hrs	0 days	Fri 7/23/0	4 Fri	7/23/04	\$20,	,000	\$0	\$0	\$20,000
	3	FNALCont	0%	0 hrs	0 days	Fri 7/23/0	4 Fri	7/23/04	\$10,	,000	\$0	\$0	\$10,000
	Note	es											
	Cost: Price is	s based on L00 installation	n fixtures										
1.1.7.	3.6		l	nner De	tector Inst	allation Fix	xtures:	test		\$7,761			
	ID	Resource Name		Units	Work	Delay		tart	F	inish			
_	8	Mech. Engineer-		25%	60 hrs	0 days		0/19/04		12/1/0			
	11	Mech. Technician		50%	120 hrs	0 days		0/19/04		12/1/0			
	12	Research Associa		50%	120 hrs	0 days		0/19/04		12/1/0			
	13	CMM Programme	r-SiDet	25%	60 hrs	0 days		0/19/04		12/1/0			
_	ID	Resource Name		Units	Cost	Baseline		Act. Co		em. Co			
	8	Mech. Engineer-		25%	\$2,541		\$0		60	\$2,54			
	11	Mech. Technician		50%	\$3,480		\$0		60	\$3,48			
	12	Research Associa		50%	\$0		\$0		60		80		
	13	CMM Programme	r-SiDet	25%	\$1,740		\$0	4	60	\$1,74	Ю		
-	Note												
5	Setup	on CMM and test alignme	ent										
1.1.7.	3.7				Fabricate	e beampip	e supp	orts	\$	56,270			
	ID	Resource Name		Units	Work	Delay	St	art	F	inish			
_	1	FNALEQ		0%	0 hrs	0 days	Wed 1	2/1/04	Wed	12/1/04	1		
	3	FNALCont		0%	0 hrs	0 days		2/1/04		12/1/04			
	6	Designer-SiDet		50%	160 hrs	0 days		2/2/04		ri 2/4/05			
	8	Mech. Engineer-		25%	80 hrs	0 days		2/2/04		ri 2/4/05			
	11	Mech. Technician		100%	320 hrs	0 days		2/2/04		ri 2/4/05			
	12	Research Associa	ite	50%	160 hrs	0 days	Thu 1	2/2/04	F	ri 2/4/05	5		
_	ID	Resource Name		Units	Cost	Baselin		Act. Co		Rem. Co			
	1	FNALEQ		0%	\$25,000		\$0		\$0	\$25,0			
	3	FNALCont		0%	\$12,500		\$0		\$0	\$12,5			
	6	Designer-SiDet	o:p ,	50%	\$6,102		\$0		\$0	\$6,1			
	8	Mech. Engineer-	SiDet	25%	\$3,388		\$0		\$0	\$3,3	88		

WBS			Name	.				Cost				
	beam	npipe supports" continued										
	ID	Resource Name	Units	Cost	Baseli	ne Cost	Act. Cos	t Rem.	Cost			
	11	Mech. Technician-SiDet	100%	\$9,280		\$0	\$0	\$9	,280			
	12	Research Associate	50%	\$0		\$0	\$0)	\$0			
	Note	es on Run IIa experience										
	based	on Run na experience										
1.1.7 1.1.7		Read				er detector er Detector		\$ \$5,70				
	ID	Resource Name	Units	Work	Delay	Start	1	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	8	Mech. Engineer-SiDet	100%	80 hrs	0 days	Thu 2/24/	05 We	ed 3/9/05	\$3,388	\$0	\$0	\$3,388
	11	Mech. Technician-SiDet	100%	80 hrs	0 days	Thu 2/24/		ed 3/9/05	\$2,320	\$0	\$0	\$2,320
	12	Research Associate	100%	80 hrs	0 days	Thu 2/24/		ed 3/9/05	\$0	\$0	\$0	\$0
	15	Scientist	100%	80 hrs	0 days	Thu 2/24/	05 We	ed 3/9/05	\$0	\$0	\$0	\$0
	Note											
	This as	ssumes the fixtures were already se	tup and alio	gned								
1.1.7.	3.10				 	Final surve	y	\$5,17	4			
	ID	Resource Name	Units	Work	Delay	Start		Finish				
	8	Mech. Engineer-SiDet	100%	40 hrs	0 days	Thu 3/10		ed 3/16/0				
	11	Mech. Technician-SiDet	200%	80 hrs	0 days	Thu 3/10		ed 3/16/0				
	12	Research Associate	100%	40 hrs	0 days	Thu 3/10		ed 3/16/0				
	13	CMM Programmer-SiDet	100%	40 hrs	0 days	Thu 3/10	/05 W	ed 3/16/0	5			
	ID	Resource Name	Units	Cost	Baselir	ne Cost A	Act. Cost	Rem. (Cost			
	8	Mech. Engineer-SiDet	100%	\$1,694		\$0	\$0		,694			
	11	Mech. Technician-SiDet	200%	\$2,320		\$0	\$0		,320			
	12	Research Associate	100%	\$0		\$0	\$0		\$0			
	13	CMM Programmer-SiDet	100%	\$1,160		\$0	\$0	\$1,	,160			
		36										
	Note	5 3										
		e alignment of the barrels is determine	ned algon v	ith alignmer	nt to externa	l reference sys	stem					
1.1.7.	relative					l reference sys ctrical Test		\$12,10	4			
1.1.7.	relative						:S	\$12,10 Finish	4			
1.1.7.	relative	e alignment of the barrels is determin	Fin	al Cooling	g and ele	ctrical Test Start	is :					

ID	Resource Name	Units	Work	Delay	Start		Finish				
11	Mech. Technician-SiDet	100%	160 hrs	0 days	Thu 3/17/05		ed 4/13/05				
12	Research Associate	400%	640 hrs	0 days	Thu 3/17/05		ed 4/13/05				
15	Scientist	100%	160 hrs	0 days	Thu 3/17/05	We	ed 4/13/05				
ID	Resource Name	Units	Cost	Baseline			Rem. Co				
7	Elect. Engineer	50%	\$4,076		\$0	\$0	\$4,07				
8	Mech. Engineer-SiDet	50%	\$3,388		\$0	\$0	\$3,38				
11	Mech. Technician-SiDet	100%	\$4,640		\$0	\$0	\$4,64				
12	Research Associate	400%	\$0		\$0	\$0		0			
15	Scientist	100%	\$0		\$0	\$0	\$	0			
No	tes										
Large	fraction of system will be run	•									
1.1.7.3.12	top of SVX extention cylin	nders (fir	nal dressir	na, positic	n monitors)		\$4,014				
	•	•	Work	Delay	Start	F	-inish	Cost	Baseline Cost	Act. Cost	Rem. Cost
ID	Resource Name	Units	VVOIR	Delay	Start		1111311	CUSI	Dascille Cost	Act. Ocst	
1D 8		100%	40 hrs		Thu 4/14/05		d 4/20/05			\$0	
	Mech. Engineer-SiDet Mech. Technician-SiDet			0 days 0 days		Wed		\$1,694 \$2,320	\$0 \$0		\$1,694 \$2,320
8	Mech. Engineer-SiDet	100%	40 hrs	0 days	Thu 4/14/05	Wed	d 4/20/05	\$1,694	\$0	\$0	\$1,694 \$2,320
8 11 12	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate	100% 200%	40 hrs 80 hrs	0 days 0 days	Thu 4/14/05 Thu 4/14/05	Wed	d 4/20/05 d 4/20/05	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,69 ² \$2,320
8 11 12 No	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes	100% 200% 100%	40 hrs 80 hrs 40 hrs	0 days 0 days 0 days	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05	Wed	d 4/20/05 d 4/20/05	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,69 ² \$2,320
8 11 12 <u>No</u> This i	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate	100% 200% 100% ing, installa	40 hrs 80 hrs 40 hrs	0 days 0 days 0 days	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05	Wed	d 4/20/05 d 4/20/05	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,69 ² \$2,320
8 11 12 <u>No</u> This i beam	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth	100% 200% 100% ing, installa	40 hrs 80 hrs 40 hrs	0 days 0 days 0 days on monitors,	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05	Wed	d 4/20/05 d 4/20/05 d 4/20/05	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,69 ² \$2,320
8 11 12 <u>No</u> This i beam 1.1.7.3.13	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth	100% 200% 100% ing, installa	40 hrs 80 hrs 40 hrs tion of positi	0 days 0 days 0 days 0 days on monitors,	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05	Wed	d 4/20/05 d 4/20/05 d 4/20/05 d 4/20/05	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,694 \$2,320
8 11 12 <u>No</u> This i beam	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth	100% 200% 100% ing, installa	40 hrs 80 hrs 40 hrs tion of positi	0 days 0 days 0 days 0 days on monitors,	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05	Wed	d 4/20/05 d 4/20/05 d 4/20/05	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,694 \$2,320
8 11 12 <u>No</u> This i beam 1.1.7.3.13	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth	100% 200% 100% ing, installa	40 hrs 80 hrs 40 hrs tion of positi	0 days 0 days 0 days on monitors, Ready for ation and	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05	Wed	d 4/20/05 d 4/20/05 d 4/20/05 d 4/20/05	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,69 ² \$2,320
8 11 12 <u>No</u> This i beam 1.1.7.3.13 1.1.8.1	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth	100% 200% 100% ing, installa	40 hrs 80 hrs 40 hrs tition of positi SVX2b I Transport	0 days 0 days 0 days on monitors, Ready for ation and	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Installation Installation	Wed	\$0 \$52,974 \$0	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,694
No This i beam 1.1.7.3.13 1.1.8.1 1.1.8.2	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth pipe supports, deflection limiters, et	100% 200% 100% ing, installa	40 hrs 80 hrs 40 hrs tition of positi SVX2b I Transport	0 days 0 days 0 days on monitors, Ready for ation and	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05	Wed	\$0 \$52,974	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,694 \$2,320
8 11 12 No This i beam 1.1.7.3.13 1.1.8 1.1.8.1 1.1.8.2 No	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth pipe supports, deflection limiters, etc	100% 200% 100% ing, installa	40 hrs 80 hrs 40 hrs tion of positi SVX2b I Transport	0 days 0 days 0 days on monitors, Ready for eation and R y Hall/ Plu	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Installation Installation Eun 2a Ends ugs Opened	Wed Wed Wed	\$0 \$52,974 \$0	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,69 ² \$2,320
8 11 12 No This i beam 1.1.7.3.13 1.1.8 1.1.8.1 1.1.8.2 No	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth pipe supports, deflection limiters, etc	100% 200% 100% ing, installa	40 hrs 80 hrs 40 hrs tion of positi SVX2b I Transport	0 days 0 days 0 days on monitors, Ready for eation and R y Hall/ Plu	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Installation Installation Eun 2a Ends ugs Opened	Wed Wed Wed	\$0 \$52,974 \$0	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,69 ⁴ \$2,320
8 11 12 No This i beam 1.1.7.3.13 1.1.8.1 1.1.8.2 No Basee Labor	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth pipe supports, deflection limiters, etc	100% 200% 100% ing, installable	40 hrs 80 hrs 40 hrs tion of positi SVX2b I Transport Assembly	0 days 0 days 0 days on monitors, Ready for eation and R y Hall/ Plu	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Installation Installation Eun 2a Ends ugs Opened	Wed Wed Wed	\$0 \$52,974 \$0	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,69 ² \$2,320
8 11 12 No This i beam 1.1.7.3.13 1.1.8.1 1.1.8.2 No Basee Labor	Mech. Engineer-SiDet Mech. Technician-SiDet Research Associate tes ncludes the final dressing of everyth pipe supports, deflection limiters, etc tes d on runiia experience, it takes 35 da :	100% 200% 100% ing, installable CDF to	40 hrs 80 hrs 40 hrs tion of positi SVX2b I Transport Assembly	0 days 0 days 0 days on monitors, Ready for ation and R y Hall/ Plu	Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Thu 4/14/05 Installation Installation Eun 2a Ends ugs Opened	Wed Wed Wed	\$0 \$52,974 \$0	\$1,694 \$2,320	\$0 \$0	\$0 \$0	\$1,69 ² \$2,320

1.1.8	.4				In	stall/test JPC		\$ 0			
1	Notes	3									
		installed onto the COT repe		ing.							
		oe performed in the Assemb	ly Hall.								
	hedul	e: e ~40 JPCs and we assume	an insallat	ion/testing rate (of 1/day						
		er cables and outer cables i				llel by a single cre	ew.				
		lone using an external DAQ/	PS unit an	d a "test wedge'	' 5 staves ur	nit.					
	bor:		O-bl"	t1.							
IS	compu	uted into the "Install/test Out	er Cables	task.							
1.1.8	.5			Insta	ll/test nev	v inner cables	3	\$0			
1	Votes	3									
Th	ese al	re the cables from the JPC t	- 41 - 10								
Ta	sk to l	oe performed in the Assemb									
Ta So	sk to l hedul	be performed in the Assemb e:	ly Hall.	esting rate of 1/	day						
Ta So W	sk to l hedule e have	be performed in the Assemb e: e ~40 bundles and assume i	oly Hall. nsallation/to								
Ta Sc W JP	sk to l hedule e have C, inn	be performed in the Assemb e:	oly Hall. nsallation/tonstallation	is performed in	parallel.	nit.					
Ta Sc W JP Te La	sk to lehedule have C, innest is debor:	pe performed in the Assemble: 2 ~40 bundles and assume intercables and outer cables identified the common	oly Hall. nsallation/t nstallation 'PS unit an	is performed in d a "test wedge"	parallel.	nit.					
Ta Sc W JP Te La	sk to lehedule have C, innest is debor:	pe performed in the Assembe: e ~40 bundles and assume intercables and outer cables in the cables in	oly Hall. nsallation/t nstallation 'PS unit an	is performed in d a "test wedge"	parallel.	nit.					
Ta Sc W JP Te La	sk to lendule have C, innest is detected by the computer of the computer is the computer of the computer is the computer is the computer of the computer is th	pe performed in the Assemble: 2 ~40 bundles and assume intercables and outer cables identified the common	oly Hall. nsallation/t nstallation 'PS unit an	is performed in d a "test wedge" task.	parallel. ' 5 staves ur	nit. Outer Cables	s \$ 7,6	80			
Ta Sc W JP Te La is	sk to I hedule have C, inn st is d bor: compu	pe performed in the Assemble: 2 ~40 bundles and assume intercables and outer cables identified the common	oly Hall. Insallation/to Installation IPS unit an IPS Cables IPS Units	is performed in d a "test wedge' task. Install, Work	parallel. ' 5 staves ur	Outer Cables Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
Ta Sc W JP Te La is	sk to I hedule have C, inn st is d bor: compu	pe performed in the Assemble: 2 ~40 bundles and assume in the cables and outer cables in the cables	nsallation/tinstallation/tinstallation/PS unit aner Cables" Units 100%	is performed in d a "test wedge" task. Install, Work 320 hrs	parallel. ' 5 staves ur /test new Delay 0 days	Outer Cables Start Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680
Ta Sc W JP Te La is	sk to I hedule e have C, innest is d bor: compu	pe performed in the Assemble: 2 ~40 bundles and assume in the cables and outer cables in the cables in the cables in the cables in the cable into the "Install/test Out" Resource Name	oly Hall. Insallation/to Installation IPS unit an IPS Cables IPS Units	is performed in d a "test wedge' task. Install, Work	parallel. ' 5 staves ur /test new Delay	Outer Cables Start	Finish	Cost			
Ta Sc W JP Te La is	sk to lichedule have C, innest is debor: computed by C and C	pe performed in the Assemble: 2 ~40 bundles and assume in the cables and outer cables in the cables and outer cables in the cables in the cables in the cable in	nsallation/tinstallation/tinstallation/PS unit aner Cables" Units 100%	is performed in d a "test wedge" task. Install, Work 320 hrs	parallel. ' 5 staves ur /test new Delay 0 days	Outer Cables Start Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680
Ta Sc W JP Te La is 1.1.8	sk to I hedulice have C, innost is door: compute. 6 D 12 Notes	pe performed in the Assemble: 2 ~40 bundles and assume in the cables and outer cables in the cables and outer cables in the cable in the	unsallation/tonstallation/tonstallation/PS unit an er Cables" Units 100% 400%	is performed in d a "test wedge" task. Install, Work 320 hrs	parallel. ' 5 staves ur /test new Delay 0 days	Outer Cables Start Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680
Ta Sc W JP Te La is 1.1.8	sk to I hedulie have C, innost is door: compute. 6 D 9 12 Notes	pe performed in the Assemble: 2 ~40 bundles and assume in the receiver cables and outer cables in the receiver cables and outer cables in the receiver cables and outer cables in the Associate cables from the JPC to the receiver cables from the JPC to the JPC to the receiver cables from the JPC to	nsallation/tinstallation/tinstallation/PS unit an er Cables" Units 100% 400%	is performed in d a "test wedge" task. Install, Work 320 hrs	parallel. ' 5 staves ur /test new Delay 0 days	Outer Cables Start Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680
Ta Sc W JP Te La is 1.1.8	sk to I hedulie have C, innost is door: compute. 6 D 9 12 Notes	pe performed in the Assemble: 2 ~40 bundles and assume in the recables and outer cables in the recables and outer cables in the recables and outer cables in the recable and outer cables in the recable and outer cables in the recables and outer cables in the Assemble recapility. The performed in the Assemble in the	nsallation/tinstallation/tinstallation/PS unit an er Cables" Units 100% 400%	is performed in d a "test wedge" task. Install, Work 320 hrs	parallel. ' 5 staves ur /test new Delay 0 days	Outer Cables Start Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680
Ta Sc W JP Te La is 1.1.8 - - Th Th Ta Sc W	sk to I hedule have C, inn st is dobor: compute 6 D 9 12 Notes ese ar sk to I hedule have	pe performed in the Assemble: a ~40 bundles and assume in the recables and outer cables in the recables and outer cables in the using an external DAQ/ atted into the "Install/test Outed into the United into the Install into the "Install/test Outed into the Install into t	nsallation/t nstallation/PS unit an er Cables" Units 100% 400% o the PS. oly Hall.	is performed in d a "test wedge" task. Install, Work 320 hrs 1,280 hrs	parallel. ' 5 staves ur /test new Delay 0 days 0 days day.	Outer Cables Start Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680
Ta Sc W JP Te La is 1.1.8 - Th Th Ta Sc W JP	sk to I heduli e have C, inn st is d bor: compute C bors C	pe performed in the Assemble: a ~40 bundles and assume in the recables and outer cables in lone using an external DAQ/ uted into the "Install/test Out Resource Name Elect. Technician Research Associate be the cables from the JPC to be performed in the Assembles: a ~40 bundles and assume in the recables and outer cables in the cables in the cables in the cables in the cables and outer cables in the c	nsallation/t nstallation/PS unit an er Cables" Units 100% 400% to the PS. bly Hall. nsallation/tr	is performed in d a "test wedge" task. Install, Work 320 hrs 1,280 hrs	parallel. 5 staves ur test new Delay 0 days 0 days day. parallel.	Outer Cables Start Tue 3/1/05 Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680
Ta Sc W JP Te La is 1.1.8 —————————————————————————————————	sk to I hedule e have C, inn st is: do not compute the	pe performed in the Assemble: a ~40 bundles and assume in the recables and outer cables in the recables and outer cables in the using an external DAQ/ atted into the "Install/test Outed into the United into the Install into the "Install/test Outed into the Install into t	nsallation/t nstallation/PS unit an er Cables" Units 100% 400% to the PS. bly Hall. nsallation/tr	is performed in d a "test wedge" task. Install, Work 320 hrs 1,280 hrs	parallel. 5 staves ur test new Delay 0 days 0 days day. parallel.	Outer Cables Start Tue 3/1/05 Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680
Ta Sc W JP Te La is 1.1.8 —————————————————————————————————	sk to I hedule e have C, inn st is dobor:	pe performed in the Assemble: a ~40 bundles and assume in the recables and outer cables in the recables and outer cables in the recables and external DAQ/ attention the "Install/test Outer the cables from the JPC to the performed in the Assembles: a ~40 bundles and assume in the recables and outer cables in the lace.	units Units 100% 400% o the PS. oly Hall. nsallation/tronstallat	is performed in d a "test wedge" task. Install, Work 320 hrs 1,280 hrs	/test new Delay 0 days 0 days 4day. parallel. 5 staves ur	Outer Cables Start Tue 3/1/05 Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680
Ta Sc W JP Te La is 1.1.8 	sk to I hedule e have C, inn st is d bor: 6 D 9 12 Notes ese al sk to I he have C (ninn st is d bor: Reseate C)	pe performed in the Assemble: a ~40 bundles and assume in the recables and outer cables in lone using an external DAQ/ uted into the "Install/test Out Resource Name Elect. Technician Research Associate be the cables from the JPC to be performed in the Assembles: a ~40 bundles and assume in the recables and outer cables in the cables in the cables in the cables in the cables and outer cables in the c	units Units 100% 400% o the PS. oly Hall. nsallation/tronstallation PS unit an	is performed in d a "test wedge" task. Install, Work 320 hrs 1,280 hrs	/test new Delay 0 days 0 days 4day. parallel. 5 staves ur	Outer Cables Start Tue 3/1/05 Tue 3/1/05	Finish Mon 4/25/05	Cost \$7,680	\$0	\$0	\$7,680

Start

Tue 2/22/05

Finish

Mon 4/18/05 \$7,680

Cost

Baseline Cost Act. Cost Rem. Cost

\$0

\$7,680

\$0

Resource Name

Elect. Technician

Units

Work

100% 320 hrs 0 days

Delay

WBS		Na	ıme			Cost				
"install/test new	power supplies and FTN	/Is" contin	ued							
ID	Resource Name	Units	Work [Delay	Start	Finish	Cost	Baseline Cost	Act. Cost F	Rem. Cost
12	Research Associate	300%	960 hrs 0	days T	ue 2/22/05 N	Mon 4/18/05	\$0	\$0	\$0	\$0
Not	~ ~									
Task to Sched	o be performed in the Collision	Hall								
This m We ha	neans remove old crates, install ave ~100 new power supplies to ork can start as soon as there	o install and	-40 FTMs.		. ,,	is rolled back into t	the collision	hall.		
We wi Labor:	Il use a passive "load box" for t	he testing of	the PS.							
1. Res	earch Associate (300%) install ct. Technician (100%) support	lation and tes	sting							
1.1.8.8			F	temove S	VXII/L00/BP	\$5,708	8			
ID	Resource Name	Unit	s Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
8	Mech. Engineer-SiDe			0 days	Tue 3/1/05	Mon 3/14/05	\$3,388	\$0	\$0	\$3,388
11	Mech. Technician-SiD			0 days	Tue 3/1/05	Mon 3/14/05	\$2,320	\$0	\$0 \$0	\$2,320
12	Research Associate	1009	% 80 hrs	0 days	Tue 3/1/05	Mon 3/14/05	\$0	\$0	\$0	\$0
Note										
I ask to	o be performed at SiDet.									
1.1.8.9				ISI read	ly for SVX2b	\$0	n			
1.1.8.10			Install		SVX2b in ISL	\$8,028				
ID	Resource Name	Unit	s Work	Delay	Start	Finish	Cost	Baseline Cos	t Act. Cost	Rem. Cost
8	Mech. Engineer-SiDe			,			. ,	•	•	\$3,388
11	Mech. Technician-SiD						. ,			\$4,640
12	Research Associate	1009	% 80 hrs	0 days	Thu 4/21/0	5 Wed 5/4/05	\$(O \$6	50 \$0	\$0
Note										
Task to	o be performed at SiDet.									
1.1.8.11			Fasten/Te	est ISL Ju	nction Cards	\$3,480	O			
ID	Resource Name	Unit	s Work	Delay	Start	Finish	Cost	Baseline Cos	t Act. Cost	Rem. Cost
11	Mech. Technician-SiD			,		Wed 5/25/05	. ,			\$3,480
12	Research Associate	2009	% 240 hrs	0 days	Thu 5/5/05	Wed 5/25/05	\$(O \$0	50 \$0	\$0

WBS		Nam	е			Cost					
"Fasten/Test ISL	. Junction Cards" continued										
Not	es										
Task t	o be performed at SiDet.										
1.1.8.12	Extension Cylind	ers Insta	ıllation ar	nd beam	pipe supports	\$1,7	12				
_ID	Resource Name	Units	Work	Delay		Finish	Cost	Baseline		t. Cost	
8	Mech. Engineer-SiDet	100%	24 hrs	0 days		Tue 5/31/05	. ,		\$0	\$0	\$1,016
11	Mech. Technician-SiDet	100%	24 hrs	0 days		Tue 5/31/05			\$0	\$0	\$696
12	Research Associate	100%	24 hrs	0 days	Thu 5/26/05	Tue 5/31/05	\$0		\$0	\$0	\$0
Not											
Task t	o be performed at SiDet.										
1.1.8.13		Franspor	t SVX2b t	to B0 &	Install in CDF	\$2,85	54				
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Co	ost Act.	Cost	Rem. Cost
8	Mech. Engineer-SiDet	100%	40 hrs	0 days	Wed 6/1/05	Tue 6/7/05	\$1,694		\$0	\$0	\$1,694
11	Mech. Technician-SiDet	100%	40 hrs	0 days	Wed 6/1/05	Tue 6/7/05	\$1,160		\$0	\$0	\$1,160
12	Research Associate	200%	80 hrs	0 days		Tue 6/7/05	\$0		\$0	\$0	\$0
15	Scientist	100%	40 hrs	0 days	Wed 6/1/05	Tue 6/7/05	\$0		\$0	\$0	\$0
Not	es										
Task to	o be performed in the Assembly Ha	II.									
1.1.8.14			In	ner cahl	les connected		ВО				
ID	Resource Name Ur	nits W		elay	Start		•	eline Cost	Act. Cost	Rem	. Cost
12						ie 6/14/05	\$0	\$0	\$0		\$0
		070 00	1110 00	ayo I	100 0/0/00	10 0/ 1 1/ 00	ΨΟ	ΨΟ	ΨΟ		ΨΟ
Not	es eables are connected to JCs.										
This is Labor:	earch Associate (200%)	rocess. NC	TESTING	is perform	ned at this time.						
1.1.8.15		Plug	s Closed	/CDF to	Collision Hall		\$ 0				
Not	es										
Labor:											

This labor is traditionally provided by CDF operations.

WBS			1	Name			Cost				
1.1.	.8.16					nect and Test	\$15,832				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	7	Elect. Engineer	50%	160 hrs	0 days	Wed 6/22/05	Wed 8/17/05	\$8,152	\$0	\$0	\$8,152
	9	Elect. Technician	100%	320 hrs	0 days	Wed 6/22/05	Wed 8/17/05	\$7,680	\$0	\$0	\$7,680
	12	Research Associate	600%	1,920 hrs	0 days	Wed 6/22/05	Wed 8/17/05	\$0	\$0	\$0	\$0
	15	Scientist	200%	640 hrs	0 days	Wed 6/22/05	Wed 8/17/05	\$0	\$0	\$0	\$0

Notes

Cables from the JPC are connected to the PS and rest of the DAQ system.

Then the final system tests.

Tests are aimed at identifying problems and troubleshooting them

Also we should try to identify the best "grounding" configuration for the detector.

We assume we can test a section of the detector corresponding to a JPC per day.

Labor:

Based on IIa experience we calculated 2 crews of 2 post-docs each + 2 post-docs for running the testing programs. All other personnel is for support and help in troubleshooting.

1.1.8.17 SVX2b Project Complete \$0												
1.	.1.9					Labor contin	ngency \$	250,000				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	3	FNALCont	0%	0 hrs	0 days	Wed 10/1/03	Wed 10/1/03	\$250,000	\$0	\$0	\$250,000	
	1.2					Central Pres	shower \$94	5,050.28				

Notes

Summary task for the Central Preradiator detector

			Resear	ch and Develo	pment \$10	01,234.00				
Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
FNALR&D	0%	0 hrs	0 days	Wed 5/1/02	Wed 5/1/02	\$55,672.00	\$0.00	\$0.00	\$55,672.00	
ItalyEQ	0%	0 hrs	0 mons	Wed 5/1/02	Wed 5/1/02	\$18,000.00	\$0.00	\$0.00	\$18,000.00	
JapanEQ	0%	0 hrs	0 mons	Wed 5/1/02	Wed 5/1/02	\$27,562.00	\$0.00	\$0.00	\$27,562.00	
	FNALR&D ItalyEQ	FNALR&D 0% ItalyEQ 0%	FNALR&D 0% 0 hrs ltalyEQ 0% 0 hrs	Resource NameUnitsWorkDelayFNALR&D0%0 hrs0 daysItalyEQ0%0 hrs0 mons	Resource NameUnitsWorkDelayStartFNALR&D0%0 hrs0 daysWed 5/1/02ItalyEQ0%0 hrs0 monsWed 5/1/02	Resource Name Units Work Delay Start Finish FNALR&D 0% 0 hrs 0 days Wed 5/1/02 Wed 5/1/02 ItalyEQ 0% 0 hrs 0 mons Wed 5/1/02 Wed 5/1/02	FNALR&D 0% 0 hrs 0 days Wed 5/1/02 Wed 5/1/02 \$55,672.00 ItalyEQ 0% 0 hrs 0 mons Wed 5/1/02 Wed 5/1/02 \$18,000.00	Resource Name Units Work Delay Start Finish Cost Baseline Cost FNALR&D 0% 0 hrs 0 days Wed 5/1/02 Wed 5/1/02 \$55,672.00 \$0.00 ItalyEQ 0% 0 hrs 0 mons Wed 5/1/02 Wed 5/1/02 \$18,000.00 \$0.00	Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost FNALR&D 0% 0 hrs 0 days Wed 5/1/02 Wed 5/1/02 \$55,672.00 \$0.00 \$0.00 ItalyEQ 0% 0 hrs 0 mons Wed 5/1/02 Wed 5/1/02 \$18,000.00 \$0.00 \$0.00	Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost FNALR&D 0% 0 hrs 0 days Wed 5/1/02 Wed 5/1/02 \$55,672.00 \$0.00 \$0.00 \$55,672.00 ItalyEQ 0% 0 hrs 0 mons Wed 5/1/02 Wed 5/1/02 \$18,000.00 \$0.00 \$0.00 \$18,000.00

Notes

This tasks covers the costs estimated for building a prototype detector module and studying the system. It is the sum of the ANL and MSU R+D proposals to FNAL, plus the 20 phototubes

purchased by Japan and the 20K euros Italy has proposed for scintillator studies.

The 20 tubes are of two types, 10 of H6568 for \$13387 and 10 of H6568 mod for

^{\$14175.} These are the final costs including all taxes and discounts.

WBS			Nam	ne			Cost			
1.2.2				.0	Procu	re parts	\$667,825.00			
	- otes				1 1000	re parts .	φοση,σ23.00			
	nmary task for the procurer	nent of all	the parts n	eeded for the	detector					
1.2.2.1					Phototubes an	d bases 🦇	\$414,236.00			
IC	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1		0%	0 hrs	0 mons	Sat 2/1/03	Sat 2/1/03	\$45,358.00	\$0.00	\$0.00	\$45,358.00
3		0%	0 hrs	0 mons	Sat 2/1/03	Sat 2/1/03	\$95,635.00	\$0.00	\$0.00	\$95,635.00
5	JapanEQ	0%	0 hrs	0 days	Sat 2/1/03	Sat 2/1/03	\$273,243.00	\$0.00	\$0.00	\$273,243.00
N	otes									
H65		ange rate a	assumed w	as 120 yen/d						es (includes 15% spares) of This gives the estimate of
1.2.2.2				Electr	onics Transiti	on Card	\$20,000.00			
IE	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1	FNALEQ	0%	0 hrs	0 days	Fri 5/16/03	Fri 5/16/03	\$15,000.00	\$0.00	\$0.00	\$15,000.00
3	FNALCont	0%	0 hrs	0 mons	Fri 5/16/03	Fri 5/16/03	\$5,000.00	\$0.00	\$0.00	\$5,000.00
N	otes									
Ver	similar to CDF Plug Show	er Max tra	nsition car	ds. Quote fro	om Gary Drake (A	rgonne engineer).				
1.2.2.3	1966 1966 1966 1966 1966 1966 1966 1966 1966 1966 1966 1966 1966 1966 1966 1966 			HV	′ Supplies and	l cables	\$75,800.00			
<u></u>	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1		0%	0 hrs	0 mons	Fri 5/16/03	Fri 5/16/03	\$8,300.00	\$0.00	\$0.00	\$8,300.00
3		0%	0 hrs	0 mons	Fri 5/16/03	Fri 5/16/03	\$17,500.00	\$0.00	\$0.00	\$17,500.00
4	ItalyEQ	0%	0 hrs	0 days	Fri 5/16/03	Fri 5/16/03	\$50,000.00	\$0.00	\$0.00	\$50,000.00
N	otes		=							
CAI	EN SY527 with 10 A932AN	cards. C	ote to Ste	efano Lami or	n 9-01-2001. add	another \$10K for	cables per Stefano	's estimate. Indirect of	cost of 16.6% ac	lded.
1.2.2.5					CPR Detect	or parts	\$132,133.00			
	otes		_							
Sun	nmary task for the parts inc	luded in th	e detector	modules.						
1.2.2.5.1					Scintillator	(JINR)	\$75,800.00			
IE	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Co	st Act. Co	st Rem. Cost
1	FNALEQ	0%	0 hrs	0 mons	Mon 2/24/03	3 Mon 2/24/	/03 \$8,300.0	00 \$0.0	00 \$0.0	00.00\$8,300.00
3	FNALCont	0%	0 hrs	0 mons	Mon 2/24/03	3 Mon 2/24/	/03 \$17,500.0	00 \$0.0	0.0\$	00 \$17,500.00

"Scintillator (JINR)" continued ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost 4 ItalyEQ 0% 0 hrs 0 days Mon 2/24/03 Mon 2/24/03 \$50,000.00
4 ItalyEQ 0% 0 hrs 0 days Mon 2/24/03 Mon 2/24/03 \$50,000.00 \$0.00 \$0.00 \$50,000.00
Mater
Notes
Assume we'll use extra MINOS scintillator, which is assumed to be available at no cost.
1.2.2.5.2 Optical Fibers and Connectors \$51,083.00
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
1 FNALEQ 0% 0 hrs 0 mons Mon 2/24/03 Mon 2/24/03 \$5,594.00 \$0.00 \$0.00 \$5,594.00
3 FNALCont 0% 0 hrs 0 mons Mon 2/24/03 Mon 2/24/03 \$11,793.00 \$0.00 \$0.00 \$11,793.00
4 ItalyEQ 0% 0 hrs 0 days Mon 2/24/03 Mon 2/24/03 \$33,696.00 \$0.00 \$0.00 \$33,696.00
WLS fiber: 54 channels * 1 fibers/channel * 1.5m average * 48 wedges * \$2/m = \$7776. \$25920. Indirect costs of 16.6% added. Sheet metal and misc. supplies \$54 channels * 1 fibers/channel * 5m average * 48 wedges * \$2/m = \$7776. Clear fiber: 54 channels * 1 fibers/channel * 5m average * 48 wedges * \$2/m = \$7776. \$54 channels * 1 fibers/channel * 5m average * 48 wedges * \$2/m = \$7776. \$55,250.00
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
1 FNALEQ 0% 0 hrs 0 mons Mon 4/21/03 Mon 4/21/03 \$3,500.00 \$0.00 \$0.00 \$3,500.00
3 FNALCont 0% 0 hrs 0 mons Mon 4/21/03 Mon 4/21/03 \$1,750.00 \$0.00 \$0.00 \$1,750.00
Notes
Estimate from Jim (Argonne): \$1000 for sheet metal, \$2500 for epoxies and other misc.
1.2.2.6 CCR Detector parts \$25,656.00
Notes
Summary task for the parts needed in the Crack Chamber modules.
1.2.2.6.1 Scintillator (JINR) \$15,166.00
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
1 FNALEQ 0% 0 hrs 0 mons Mon 2/24/03 Mon 2/24/03 \$1,666.00 \$0.00 \$0.00 \$1,666.00
3 FNALCont 0% 0 hrs 0 mons Mon 2/24/03 Mon 2/24/03 \$3,500.00 \$0.00 \$0.00 \$3,500.00
4 ItalyEQ 0% 0 hrs 0 mons Mon 2/24/03 Mon 2/24/03 \$10,000.00 \$0.00 \$0.00 \$10,000.00
Notes Physiciat actimate, Indirect acets of 16.5% added

Physicist estimate. Indirect costs of 16.6% added.

WBS				Nam	e.			Со	st						
1.2.2	2.6.2					bers and Conr	nectors		440.00						
	ID	Resource Name	Units	Work	Delay	Start	F	inish	Cos	t Ba	aseline C	ost .	Act. Co	st Rem. Co	st
	1	FNALEQ	0%	0 hrs	1.95 mor	ns Thu 4/17/0	03 Thu	4/17/03	\$1,000	.00	\$0	.00	\$0.0	00 \$1,000.0	00
	3	FNALCont	0%	0 hrs	2 mor	ns Fri 4/18/0	03 Fri	4/18/03	\$2,200	.00	\$0	.00	\$0.0	00 \$2,200.0	00
	4	ItalyEQ	0%	0 hrs	2 mor	ns Fri 4/18/0	03 Fri	4/18/03	\$6,240	.00	\$0	.00	\$0.0	00 \$6,240.0	00
	Not														
		10 channels * 1 fiber/ch	annel * 1.5	m average	* 48 wedges	* \$2/m = \$1440		Clear: 10	channels * 1	fiber/chan	nnel * 5m av	erage *	48 wedge	es * \$2/m = \$4800).
1.2.2				5	Sheet met	al and misc. su	ıpplies	\$1,	050.00						
	ID	Resource Name	Units	Work	Delay	Start	Fin	ish	Cost	Baseli	ne Cost	Act.	Cost	Rem. Cost	
	1	FNALEQ	0%	0 hrs	0 mons	Mon 4/21/03	Mon 4	/21/03	\$700.00		\$0.00	9	\$0.00	\$700.00	
	3	FNALCont	0%	0 hrs	0 mons	Mon 4/21/03	Mon 4	/21/03	\$350.00		\$0.00	9	\$0.00	\$350.00	
	Not	es													
	Physic	cist estimate.													
1.2.2	2.6.4			Scir	itillator an	d fiber orders	placed		\$0.00						
	2.2.7					ototube order			\$0.00						
	2.2.8					nal phototubes			\$0.00						
	2.3					R Detector Ass		¢ 102	915.28						
	ı.∠.ə Not	05			CFI	C Detector Ass	ешыу	⊅10∠ ,	913.20						
		ary task for the assembly	of the CP	R modules											
1.2	2.3.1					epare scintillate	or tiles	\$63,	,666.00						
	ID	Resource Name		Unit	s Wo	rk Delay	Sta	art	Finish]					
	1	FNALEQ		09	6 0	hrs 0 days	Fri 5/	/16/03	Fri 5/16	/03					
	3	FNALCont		09		hrs 0 mons		/16/03	Fri 5/16						
	6	Mech. Technician	ı II	1009	6 1,296	hrs 0 mons	Mon 5/	/19/03	Tue 1/20	/04					
	7	Mech. Technical	Specialis			hrs 0 mons	Mon 5	/19/03	Tue 1/20	/04					
	ID	Resource Name		Unit	s Co	st Baseli	ne Cost	Act. C	ost Rer	n. Cost					
	1	FNALEQ		09		\$0.00	\$0.00	\$0.		\$0.00	_				
	3	FNALCont		09	6 \$21,2	22.00	\$0.00	\$0.	.00 \$21	,222.00					
	6	Mech. Technician	ı II	1009			\$0.00	\$0.		,808.00					
	7	Mech. Technical	Specialis	st 25%	6 \$12,6	36.00	\$0.00	\$0.	.00 \$12	,636.00					

Prepare scintilla	ator thes continued									
_Not			_							
Wene	ate 1 tile every 30 minutes eed 54*48 for CPR= 2592 his 50% contingency.									
1.2.3.3				Assem	ble bottom of m	nodule \$	5,607.04			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost E	Baseline Cost A	Act. Cost F	Rem. Cost
1	FNALEQ	0%	0 hrs	0 days		•	34,307.04	\$0.00		\$4,307.04
3	FNALCont	0%	0 hrs	0 mons	Fri 5/16/03	Fri 5/16/03 \$	31,300.00	\$0.00	\$0.00	\$1,300.00
_Not	tes		_							
Jim(A	rgonne): 1.5 hr * 48 * \$59	9.82/hr	_							
1.2.3.4				Ins	talling fibers int	to tiles \$1	8,656.80			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	st Act. Cos	st Rem. Cost
1				0 1	NA 0/40/00	Mars C/4C/00	P44 25C 0	\$0.00	0 \$0.0	0 \$14,356.80
•	FNALEQ	0%	0 hrs	0 days	Mon 6/16/03	Mon 6/16/03	T /	·	•	. ,
3 Not Jim(A	FNALCont tes rgonne) estimate for Mino	0% os-type det	0 hrs	0 mons	Mon 6/16/03 82/hr = \$28713.60.	Mon 6/16/03 Mon 6/16/03	\$4,300.00	·	•	. ,
3 Not Jim(A For a	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a pattern. Assume overall of	0% os-type det assume x3	0 hrs	0 mons nrs * 48 * 59. but a more o	Mon 6/16/03 82/hr = \$28713.60. complicated		. ,	·	•	. ,
3 <u>Not</u> Jim(A For a fiber p	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a pattern. Assume overall of	0% os-type det assume x3	0 hrs	0 mons ones * 48 * 59. s but a more of bna-type dete	Mon 6/16/03 82/hr = \$28713.60. complicated	Mon 6/16/03	. ,	·	•	. ,
3 Not Jim(A For a fiber p \$1435	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a pattern. Assume overall of	0% os-type det assume x3	0 hrs	0 mons ones * 48 * 59. s but a more of bna-type dete	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore	Mon 6/16/03	\$4,300.00	·	•	. ,
3 Not Jim(A For a fiber p \$1435	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a pattern. Assume overall of	0% os-type det assume x3 x2 less lab	0 hrs tector: 10 less fibers or for a Du	0 mons ones * 48 * 59. but a more of bona-type dete	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore Assemble modu	Mon 6/16/03	\$4,300.00 67,492.72) \$0.0¢	0 \$0.0	0 \$4,300.00
3 Not Jim(A For a fiber p \$1435	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a sattern. Assume overall of 66.80.	0% os-type det assume x3 <2 less lab Units	0 hrs lector: 10 less fibers or for a Du	0 mons ones * 48 * 59. but a more of bna-type dete	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore Assemble modu	Mon 6/16/03 ule top \$ Finish	\$4,300.00 57,492.72 Cost	Baseline Cost	0 \$0.0 Act. Cost	0 \$4,300.00 Rem. Cost
3 Not Jim(A For a fiber p \$1435 1.2.3.7 ID 1	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a sattern. Assume overall of 66.80. Resource Name FNALEQ FNALCont	0% os-type det sssume x3 v2 less lab Units 0%	0 hrs lector: 10 less fibers or for a Du Work 0 hrs	0 mons ones * 48 * 59. but a more of bna-type deter Delay 0 days	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore Assemble modu Start Tue 7/15/03	Mon 6/16/03 ule top \$ Finish Tue 7/15/03	\$4,300.00 \$7,492.72 Cost \$5,742.72	Baseline Cost \$0.00	Act. Cost \$0.00	Rem. Cost \$5,742.72
3 Not Jim(A For a fiber p \$1435 1.2.3.7 ID 1 3 Not	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a sattern. Assume overall of 66.80. Resource Name FNALEQ FNALCont	0% os-type det assume x3 v2 less lab Units 0% 0%	0 hrs lector: 10 less fibers or for a Du Work 0 hrs	0 mons ones * 48 * 59. but a more of bna-type deter Delay 0 days	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore Assemble modu Start Tue 7/15/03	Mon 6/16/03 ule top \$ Finish Tue 7/15/03	\$4,300.00 \$7,492.72 Cost \$5,742.72	Baseline Cost \$0.00	Act. Cost \$0.00	Rem. Cost \$5,742.72
3 Not Jim(A For a fiber p \$1435 1.2.3.7 ID 1 3 Not	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a pattern. Assume overall of 66.80. Resource Name FNALEQ FNALCont	0% os-type det assume x3 v2 less lab Units 0% 0%	0 hrs lector: 10 less fibers or for a Du Work 0 hrs	0 mons ones * 48 * 59. but a more of bna-type deter Delay 0 days	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore Assemble modu Start Tue 7/15/03	Mon 6/16/03 ule top \$ Finish Tue 7/15/03 Tue 7/15/03	\$4,300.00 \$7,492.72 Cost \$5,742.72	Baseline Cost \$0.00	Act. Cost \$0.00	Rem. Cost \$5,742.72
Not Jim(A For a fiber p \$1435 1.2.3.7 ID 1 3 Not Jim(A	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a pattern. Assume overall of 66.80. Resource Name FNALEQ FNALCont	0% os-type det assume x3 v2 less lab Units 0% 0%	0 hrs lector: 10 less fibers or for a Du Work 0 hrs	0 mons ones * 48 * 59. but a more of bna-type deter Delay 0 days	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore Assemble modu Start Tue 7/15/03 Tue 7/15/03	Mon 6/16/03 ule top \$ Finish Tue 7/15/03 Tue 7/15/03	\$4,300.00 67,492.72 Cost \$5,742.72 \$1,750.00	Baseline Cost \$0.00	Act. Cost \$0.00 \$0.00	Rem. Cost \$5,742.72 \$1,750.00
3 Not Jim(A For a fiber p \$1435 1.2.3.7 ID 1 3 Not Jim(A 1.2.3.8	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a battern. Assume overall of 66.80. Resource Name FNALEQ FNALCont tes rgonne): 2hr * 48 * 59.82. Resource Name FNALEQ	0% ps-type det assume x3 x2 less lab Units 0% /hr Units 0%	O hrs dector: 10 less fibers or for a Du Work O hrs O hrs	0 mons ones * 48 * 59. but a more of bna-type deter Delay 0 days 0 mons	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore Assemble modu Start Tue 7/15/03 Tue 7/15/03 Quality c	Mon 6/16/03 ule top \$ Finish Tue 7/15/03 Tue 7/15/03	\$4,300.00 \$7,492.72 Cost \$5,742.72 \$1,750.00 \$7,492.72 Cost	Baseline Cost \$0.00 \$0.00	Act. Cost \$0.00 \$0.00	Rem. Cost \$5,742.72 \$1,750.00
3 Not Jim(A For a fiber p \$1435 1.2.3.7 ID 1 3 Not Jim(A 1.2.3.8 ID	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a battern. Assume overall of 66.80. Resource Name FNALEQ FNALCont tes rgonne): 2hr * 48 * 59.82. Resource Name	0% ps-type det assume x3 2 less lab Units 0% 0% /hr Units	O hrs Lector: 10 less fibers or for a Du Work O hrs O hrs Work	0 mons ons * 48 * 59. but a more of bna-type determined bna-type	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore Assemble modu Start Tue 7/15/03 Tue 7/15/03 Quality constant	Mon 6/16/03 ule top \$ Finish Tue 7/15/03 Tue 7/15/03 ontrol \$ Finish	\$4,300.00 67,492.72 Cost \$5,742.72 \$1,750.00 67,492.72 Cost \$5,742.72	Baseline Cost \$0.00 \$0.00 Baseline Cost	Act. Cost \$0.00 \$0.00 Act. Cost \$0.00	Rem. Cost \$5,742.72 \$1,750.00 Rem. Cost \$5,742.72
3 Not Jim(A For a fiber p \$1435 1.2.3.7 ID 1 3 Not Jim(A 1.2.3.8 ID 1 3 Not Not Not Not	FNALCont tes rgonne) estimate for Mino Dubna-type detector we a battern. Assume overall of 16.80. Resource Name FNALEQ FNALCont tes rgonne): 2hr * 48 * 59.82 Resource Name FNALEQ FNALCont	0% ps-type det assume x3	O hrs Dector: 10 less fibers or for a Du Work O hrs O hrs Work Work O hrs	0 mons ones * 48 * 59. but a more of bna-type determines Delay 0 days 0 mons Delay Delay O days	Mon 6/16/03 82/hr = \$28713.60. complicated ector, therefore Assemble modu Start Tue 7/15/03 Tue 7/15/03 Quality c Start Mon 6/16/03	Mon 6/16/03 ule top \$ Finish Tue 7/15/03 Tue 7/15/03 ontrol \$ Finish Mon 6/16/03	\$4,300.00 67,492.72 Cost \$5,742.72 \$1,750.00 67,492.72 Cost \$5,742.72	Baseline Cost \$0.00 \$0.00 Baseline Cost \$0.00	Act. Cost \$0.00 \$0.00 Act. Cost \$0.00	Rem. Cost \$5,742.72 \$1,750.00 Rem. Cost \$5,742.72

WBS				Nam	е			Cost				
1.2.3	2 10				1ct modul	e finished and	tostod	ΦΩ	.00			
1	.2.4				CCI	R Detector Ass	embly S	\$19,076.	.00			
	Note											
	Summ	ary task for the construc	tion of the (Central Cra	ack chamber	modules.						
1.2	.4.1				Pro	epare scintillato	or tiles	\$12,576.	.00			
	ID	Resource Name		Unit	s Worl	k Delay	Start	Fir	nish			
	3	FNALCont		09	% 0 h	rs 0 mons	Tue 8/12/03	Tue 8	3/12/03			
	4	ItalyEQ		09			Tue 8/12/03		3/12/03			
	6	Mech. Techniciar		1009			Wed 8/13/03		9/26/03			
	7	Mech. Technical	Specialis	st 259	% 64 h	rs 0 mons	Wed 8/13/03	Fri 9	9/26/03			
	ID	Resource Name		Unit	s Co	st Baselin	e Cost Act.	Cost	Rem. Cost	_		
	3	FNALCont		09				\$0.00	\$4,192.00			
	4	ItalyEQ		09		0.00		\$0.00	\$0.00			
	6	Mech. Technician		1009			•	\$0.00	\$5,888.00			
	7	Mech. Technical	Specialis	st 25°	% \$2,49	6.00	\$0.00	\$0.00	\$2,496.00			
	Note	~ ~										
	CCR h	nas 20% of CPR channel	ls. Assum	e 20% of 0	CPR labor.							
	CCR h	~ ~				with CPR proc	cedure	\$6,500.	.00			
	CCR h	nas 20% of CPR channel				with CPR prod Start	cedure Finish			aseline Cost	Act. Cost	Rem. Cost
	CCR h Give it	nas 20% of CPR channel 50% contingency.	ļ.	Assembl	e detector	•	Finish	(aseline Cost \$0.00	Act. Cost \$0.00	Rem. Cost \$5,000.00
	CCR h Give it .4.2	Resource Name	/ Units	Assembl Work	e detector Delay	Start	Finish	03 \$5,	Cost Ba			
1.2	CCR h Give it .4.2 ID 1 3	nas 20% of CPR channel 50% contingency. Resource Name FNALEQ FNALCont	Units 0%	Assembl Work 0 hrs	e detector Delay 0 mons	Start Wed 9/10/03	Finish Wed 9/10/	03 \$5,	Cost Ba ,000.00	\$0.00	\$0.00	\$5,000.00
1.2	CCR h Give it .4.2 ID 1 3	Resource Name FNALEQ FNALCont	Units 0%	Assembl Work 0 hrs	e detector Delay 0 mons	Start Wed 9/10/03	Finish Wed 9/10/	03 \$5,	Cost Ba ,000.00	\$0.00	\$0.00	\$5,000.00
1.2	CCR h Give it .4.2 ID 1 3 Note	nas 20% of CPR channel 50% contingency. Resource Name FNALEQ FNALCont	Units 0%	Assemble Work 0 hrs 0 hrs	e detector Delay 0 mons 0 mons	Start Wed 9/10/03 Wed 9/10/03	Finish Wed 9/10/0 Wed 9/10/0	03 \$5, 03 \$1,	Cost Ba ,000.00 ,500.00	\$0.00	\$0.00	\$5,000.00
1.2	CCR h Give it .4.2 ID 1 3	nas 20% of CPR channel 50% contingency. Resource Name FNALEQ FNALCont	Units 0%	Assemble Work 0 hrs 0 hrs	e detector Delay 0 mons 0 mons	Start Wed 9/10/03	Finish Wed 9/10/0 Wed 9/10/0 tested	03 \$5, 03 \$1,	Cost Ba ,000.00 ,500.00	\$0.00	\$0.00	\$5,000.00
1.2	CCR r Give it .4.2 ID 1 3 Note Physic	nas 20% of CPR channel 50% contingency. Resource Name FNALEQ FNALCont	Units 0%	Assemble Work 0 hrs 0 hrs	e detector Delay 0 mons 0 mons	Start Wed 9/10/03 Wed 9/10/03 e finished and	Finish Wed 9/10/0 Wed 9/10/0 tested	03 \$5, 03 \$1, \$0.	Cost Ba ,000.00 ,500.00	\$0.00 \$0.00	\$0.00 \$0.00	\$5,000.00 \$1,500.00
1.2	CCR r Give it .4.2 ID 1 3 Note Physic .4.3	Resource Name FNALEQ FNALCont es cist estimate Resource Name FNALEQ FNALCONT	Units 0% 0% Units 0%	Assemble Work 0 hrs 0 hrs	e detector Delay 0 mons 0 mons	Start Wed 9/10/03 Wed 9/10/03 e finished and Fiber Bo	Finish Wed 9/10/0 Wed 9/10/0 tested undles	03 \$5, 03 \$1, \$0. \$54,000.	Cost Ba ,000.00 ,500.00 .00 Baseline C	\$0.00 \$0.00 Cost Act. Co	\$0.00 \$0.00	\$5,000.00 \$1,500.00 Cost 0.00
1.2	CCR r Give it .4.2 ID 1 3 Note Physic .4.3 .2.5 ID	Resource Name FNALEQ FNALCont es cist estimate Resource Name	Units 0% 0% Units	Assemble Work O hrs O hrs Work	e detector Delay 0 mons 0 mons 1st modul	Start Wed 9/10/03 Wed 9/10/03 Wed 9/10/03 e finished and Fiber Bu	Finish Wed 9/10/0 Wed 9/10/0 tested undles Finish	03 \$5, 03 \$1, \$0. \$54,000 Cost	Cost Ba ,000.00 ,500.00 .00 Baseline C	\$0.00 \$0.00	\$0.00 \$0.00	\$5,000.00 \$1,500.00
1.2 1.2 1	CCR r Give it .4.2 ID 1 3 Note Physic .4.3 .2.5 ID 1 3 Note	Resource Name FNALEQ FNALCont es cist estimate Resource Name FNALCOnt Resource Name FNALCONT	Units 0% 0% Units 0%	Assemble Work 0 hrs 0 hrs Work 0 hrs	e detector Delay 0 mons 0 mons 1st modul Delay 0 mons	Start Wed 9/10/03 Wed 9/10/03 e finished and Fiber Bound Start Mon 5/19/03	Finish Wed 9/10/0 Wed 9/10/0 tested undles Finish Fri 5/7/04	\$0.00 03 \$5, 03 \$1, \$0.00	Cost Ba ,000.00 ,500.00 .00 Baseline C	\$0.00 \$0.00 Cost Act. Co	\$0.00 \$0.00	\$5,000.00 \$1,500.00 Cost 0.00

WBS			Nam	ne			Cost			
1.2.5.1		Desiç	gn of pho	ototube fix	tures and clear	fibers	\$13,000.00			
IC	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
1		0%	0 hrs	0 mons		Fri 5/16/03	\$10,000.00	\$0.00		\$10,000.00
3	FNALCont	0%	0 hrs	0 mons	Fri 5/16/03	Fri 5/16/03	\$3,000.00	\$0.00	\$0.00	\$3,000.00
1.2.5.4				Assemb	le clear fiber b	undles :	\$13,000.00			
<u> IC</u>		Units	Work	Delay	Start	Finish	Cost	Baseline Co		
1	FNALEQ	0%	0 hrs	0 mons	Wed 11/5/03		. ,	· ·	•	
3	FNALCont	0%	0 hrs	0 mons	Wed 11/5/03	Wed 11/5/	03 \$3,000.	00 \$0.0	00 \$0.0	0 \$3,000.00
1.2.5.5				Asseml	ole WLS fiber p	oigtails :	\$13,000.00			
<u> IC</u>		Units	Work	Delay	Start	Finish	Cost			Rem. Cost
1		0%	0 hrs	0 mons		Fri 5/16/03	\$10,000.00	\$0.00		\$10,000.00
3	FNALCont	0%	0 hrs	0 mons	Fri 5/16/03	Fri 5/16/03	\$3,000.00	\$0.00	\$0.00	\$3,000.00
1.2.5.6				Assemb	ole phototube fi	xtures	\$15,000.00			
IC	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Co	st Act. Co	st Rem. Cost
1	FNALEQ	0%	0 hrs	0 mons	Wed 11/5/03	Wed 11/5/	03 \$10,000.	00 \$0.0	00 \$0.0	0 \$10,000.00
3	FNALCont	0%	0 hrs	0 mons	Wed 11/5/03	Wed 11/5/	03 \$5,000.	00 \$0.0	0.0 \$0.0	0 \$5,000.00
	otes		_							
Phy	sicist guess at this point.									
1.2.5.7	7			1st WLS	fiber bundle fi	nished	\$0.00			
1.3			F	Run IIb Da	ta Acquisition _l	oroject \$1,	199,907.20			
<u>N</u>	otes		_							
Data	a Aquisition project is most	ly the upgr	ade of the l	evel3 and eve	ent builder systems	plus some minor	r upgrade in the co	emputing related.		
1.3.1				Εv	en∖t-Builder Up	ograde \$	557,411.20			
A 1	-4									

The Event Builder upgrade is based on the same technology as the first one except for increased bandwidth. This path has been chosen since the increase in throughput and rate a mild and using the same technology minimizes the effort needed for the upgrade.

The details of the purchase and all parts are assumed to be equal to the purchase of the present Event Builder hardware. According to somewhat outdated quotes the hardware costs about 500k.

Contingency is included in the sense that these are old quotes and the hardware will only become cheaper, although not by much.

Further Details on the Hardware from a quote from December 2001

WBS		Name			Cost				
	Upgrade" continued								
	tes								
16 C	cost ort ASX 4000 (Marconi) IC12 PCI cards (ForeRunnerH IC-12 PMC carss (Cyclonwe P								
Tota	I	\$305k							
1 Sp 3 Sp	are switch backbone are switch module are PCI cards are ATM cards	\$51k \$40k \$6k \$12k \$109k							
	I including spares iding 30% contingency	\$414k \$538k							
1.3.1.1			uŗ	ograde software	s \$7,280.	00			
	tes								
One	postdoc/researcher type is nee	ded 100% of the tim	e to work on this	project. Probably a	second person will s	split the work wit	th this person and bot	h work 50% of t	heir time.
1.3.1.1.1			decide on t	he OS versions	\$1,040.	00			
_ID	Resource Name	Units Work		Start	Finish	_			
5	Research Associate	50% 40 hrs	0 days	Γue 11/25/03	Wed 12/10/03				
<u>ID</u>	Resource Name	Units Co			Cost Rem. Co				
5	Research Associate	50% \$1,04	0.00	\$0.00	50.00 \$1,040.	.00			
1.3.1.1.2	test avai	lable drivers fo	compatibility	/ with hardware	\$624.	00			
ID	Resource Name	Units Wor		Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
5	Research Associate	20% 24 h	,	Thu 12/11/03	Wed 1/14/04	T	\$0.00	\$0.00	\$624.00
7	Students	100% 120 h	rs 0 days	Thu 12/11/03	Wed 1/14/04	\$0.00	\$0.00	\$0.00	\$0.00
1.3.1.1.3		adj	ust drivers fo	r special needs	\$5,408.	00			
ID	Resource Name	Units Wo			Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
5 7	Research Associate		hrs 0 days			\$5,408.00	\$0.00	\$0.00	\$5,408.00
1	Students	100% 1,040	hrs 0 days	Thu 1/15/04	- 711 // 10/04	\$0.00	\$0.00	\$0.00	\$0.00

			1	Name			Cos	t			
1.3.1.1.	.4			;	adjust rer	naining softwa	re \$2	08.00			
11	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	5	Research Associate	20%	8 hrs	0 days	Mon 7/19/04	Fri 7/23/04	\$208.00	\$0.00	\$0.00	\$208.00
-	7	Students	100%	40 hrs	0 days	Mon 7/19/04	Fri 7/23/04	\$0.00	\$0.00	\$0.00	\$0.00
1.3.1.1. 1.3.1.		MS	3: establi	sh genera		nality of softwa ew infrastructu		\$0.00 06.40			
	Notes	×									
Tw	vo stud	dents are needed 50% of th	eir time to	disassemel t	he system. <i>F</i>	A electrician is need	led in case the AC	needs to be u	ıpgraded (bring this u	o in the meeting	ı).
1.3.1.2.	.1			estab	lish coolir	ng plan, 3rd flo	or \$2,9	12.00			
II.	ID	Resource Name U	nits W	ork De	elay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	6	Scientist I 10	00% 56	hrs 0 c	days Mo	on 1/19/04 Tu	ue 1/27/04 \$	2,912.00	\$0.00	\$0.00	\$2,912.00
								.			
1.3.1.2.	.2				ınter	locks are broke	en	\$0.00			
1.3.1.2.	.3			disasser	mble old	system, 3rd flo	or \$1	66.40			
I	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost E	Baseline Cost A	Act. Cost F	Rem. Cost
	5	Research Associate	20%	6.4 hrs	0 days	Tue 1/4/05	Fri 1/7/05	6166.40	\$0.00	\$0.00	\$166.40
-	7	Students	100%	32 hrs	0 days	Tue 1/4/05	Fri 1/7/05	\$0.00	\$0.00	ውር ርር	
							1 11 1/1/03	Ψ0.00	ψ0.00	\$0.00	\$0.00
1.3.1.2.	.4	shu	tdown sy	stem to p	repare A	C work, 3rd flo		83.20	Ψ0.00	\$ 0.00	\$0.00
		shu Resource Name	ıtdown sy Units	rstem to p Work	orepare A	C work, 3rd flo			Baseline Cost	Act. Cost	
<u></u>	ID		•	•	Delay 0 days	· ·	or \$	83.20 Cost		Act. Cost \$0.00	
<u> </u>	ID 5	Resource Name	Units	Work	Delay	Start	or \$ Finish Tue 1/11/05	83.20 Cost 5 \$83.20	Baseline Cost	Act. Cost	Rem. Cost
<u> </u>	ID 5 7	Resource Name Research Associate	Units 20%	Work 3.2 hrs	Delay 0 days 0 days	Start Mon 1/10/05	or \$ Finish Tue 1/11/08 Tue 1/11/08	83.20 Cost 5 \$83.20	Baseline Cost \$0.00	Act. Cost \$0.00	Rem. Cost \$83.20
1.3.1.2.	ID 5 7 .5	Resource Name Research Associate	Units 20%	Work 3.2 hrs	Delay 0 days 0 days	Start Mon 1/10/05 Mon 1/10/05	or \$ Finish Tue 1/11/08 Tue 1/11/08	83.20	Baseline Cost \$0.00	Act. Cost \$0.00 \$0.00	Rem. Cost \$83.20 \$0.00
1.3.1.2.	ID 5 7 .5 ID	Resource Name Research Associate Students	Units 20% 100%	Work 3.2 hrs 16 hrs	Delay 0 days 0 days upgra	Start Mon 1/10/05 Mon 1/10/05 ade AC, 3rd flo	or \$ Finish Tue 1/11/05 Tue 1/11/05 or \$3,5 Finish	83.20	Baseline Cost \$0.00 \$0.00	Act. Cost \$0.00 \$0.00	Rem. Cost \$83.20 \$0.00 st Rem. Cost
1.3.1.2.	5 7 .5 ID 4	Resource Name Research Associate Students Resource Name	Units 20% 100% Units	Work 3.2 hrs 16 hrs Work	Delay 0 days 0 days upgra Delay 0 days	Start Mon 1/10/05 Mon 1/10/05 ade AC, 3rd flo	or \$ Finish Tue 1/11/05 Tue 1/11/05 or \$3,5 Finish Tue 2/8/05	83.20	Baseline Cost \$0.00 \$0.00	Act. Cost \$0.00 \$0.00	Rem. Cost \$83.20 \$0.00 st Rem. Cost
1.3.1.2. 1.3.1.2. 1.3.1.2.	5 7 .5 ID 4	Resource Name Research Associate Students Resource Name Elect. Technician I Resource Name	Units 20% 100% Units 100% Units	Work 3.2 hrs 16 hrs Work	Delay 0 days 0 days upgra Delay 0 days	Start Mon 1/10/05 Mon 1/10/05 Mode AC, 3rd flog Start Wed 1/12/05 semble 3rd flog Start	or \$ Finish Tue 1/11/05 Tue 1/11/05 or \$3,5 Finish Tue 2/8/05 or \$1 Finish	83.20 Cost 5 \$83.20 5 \$0.00 20.00 Cost \$3,520.0 24.80 Cost	Baseline Cost \$0.00 \$0.00	Act. Cost \$0.00 \$0.00	Rem. Cost \$83.20 \$0.00 st Rem. Cost
1.3.1.2. 1.3.1.2. 1.3.1.2.	5 7 .5 ID 4 .6 ID 5	Resource Name Research Associate Students Resource Name Elect. Technician I Resource Name Research Associate	Units 20% 100% Units 100% Units 20%	Work 3.2 hrs 16 hrs Work 160 hrs Work 4.8 hrs	Delay 0 days 0 days upgra Delay 0 days reas Delay 0 days	Start Mon 1/10/05 Mon 1/10/05 ade AC, 3rd flog Start Wed 1/12/05 semble 3rd flog Start Wed 2/9/05	or \$ Finish Tue 1/11/05 Tue 1/11/05 or \$3,5 Finish Tue 2/8/05 or \$1 Finish Fri 2/11/05	83.20 Cost 5 \$83.20 5 \$0.00 20.00 Cost \$3,520.0 24.80 Cost \$124.80	Baseline Cost \$0.00 \$0.00 Baseline Co 0 \$0.00 Baseline Cost \$0.00	Act. Cost \$0.00 \$0.00 st Act. Co Act. Cost \$0.00	Rem. Cost \$83.20 \$0.00 st Rem. Cost 00 \$3,520.00 Rem. Cost \$124.80
1.3.1.2. 1.3.1.2. 1.3.1.2.	5 7 .5 ID 4 .6 ID 5	Resource Name Research Associate Students Resource Name Elect. Technician I Resource Name	Units 20% 100% Units 100% Units	Work 3.2 hrs 16 hrs Work 160 hrs	Delay 0 days 0 days upgra Delay 0 days reas Delay	Start Mon 1/10/05 Mon 1/10/05 Mode AC, 3rd flog Start Wed 1/12/05 semble 3rd flog Start	or \$ Finish Tue 1/11/05 Tue 1/11/05 or \$3,5 Finish Tue 2/8/05 or \$1 Finish	83.20 Cost 5 \$83.20 5 \$0.00 20.00 Cost \$3,520.0 24.80 Cost	Baseline Cost \$0.00 \$0.00 Baseline Co 0 \$0.00 Baseline Cost	Act. Cost \$0.00 \$0.00 st Act. Co 0 \$0.0	Rem. Cost \$83.20 \$0.00 st Rem. Cost 00 \$3,520.00

WBS				Name			Cost					
	3.1.3				constri	uct prototype		00				
1.	O. 1.5 Not	es			CONSTI	ici prototype	Ψ134,910.	00				
		ation and commissioning	of the prototyp	e system will be	done by two s	tudents using 50	% of their time supe	ervised by a po	ostdoc/researcher	type.		
1.3.	1.3.1			purchase	prototype	system (1/4)	\$134,500.	00				
1.3.1.	3.1.1		;	submit PO aı	nd impleme	entation plan	\$134,500.	00				
	ID	Resource Name	Units V	ork Delay	Star	t Fin	ish Co	st Ba	seline Cost	Act. Cost	Rem. Cost	
	1	FNALEQ		hrs 0 days			. ,		\$0.00	\$0.00	\$103,500.00	
	2	FNALCont	100%	hrs 0 days	s Mon 2/9	9/04 Mon 2	2/9/04 \$31,0	00.00	\$0.00	\$0.00	\$31,000.00	
	Not											
		etails of the purchase and 500k. The prototype syste					sent Event Builder h	ardware. Acco	ording to somewh	at outdated quo	es the hardware cost	S
		, ,, ,			`	,						
	Contin	gency is included in the s	ense that thes	e are old quotes	and the hardw	vare will only bed	come cheaper, althou	ugh not by mu	ch.			
1.3.1.	3.1.2				purchas	e formalities	\$0.	00				
1.3.1.	313				arrival of t	he hardware	\$0.	00				
	1.3.2											
1.3.		Descrives Nome	مانوا ا	\/\/awle		all test stand	·		Dogalina Cost	A at Cas	Dam Coot	
	<u>ID</u> 5	Resource Name Research Associa	Units te 20%	Work 2.67 hrs	Delay 0 days	Start Tue 5/4/04	Finish Wed 5/5/04	Cost E \$69.33	Baseline Cost \$0.00			
	5 7	Students	100%	13.33 hrs	,	Tue 5/4/04 Tue 5/4/04	Wed 5/5/04 Wed 5/5/04	\$0.00	\$0.00 \$0.00	•	•	
	- 								40.00	4 0.00		
1.3.	1.3.3					est test stand	40.00					
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline C			
	5	Research Associa		13.33 hrs	,	Wed 5/5/04	Mon 5/17/04	\$346.67			.00 \$346.67	
	7	Students	100%	66.67 hrs	0 days	Wed 5/5/04	Mon 5/17/04	\$0.00	\$ 0	.00 \$0	.00 \$0.00	
1.3.	1.3.4		MS	: establish fu	unctionality	of hardware	\$0.	00				
1	3.1.4			CC	nstruct full	size system	\$404,332.	00				
	Not	es			moti dot ran	0.20 0,0.0	ψ 10 1,00 <u>2</u> 1					
		r to the construction of the	e prototype two	students with 5	0% of their tim	ne supervised by	a postdoc/research	er type.				
1.3.	1.4.1			purcha	ıse remaini	ng hardware	\$403,500.	00				
				1		5	+, >					

WBS		l	Name			Co	est							
1.3.1.4.1.1		S	ubmit PO	and imp	lementation p	olan \$403	,500.00							
ID	Resource Name l	Units W	ork Del	ay	Start	Finish	Cost	Baseline Cost	t Act. Cost	Rem. Cost				
1 2			hrs 0 da hrs 0 da	,		/lon 5/17/04 /lon 5/17/04	\$310,500.00 \$93,000.00		•					
1.3.1.4.1.2 1.3.1.4.1.3 1.3.1.4.2		in	stall new	arriva	chase formali I of the hardw e in B0 third fl	are	\$0.00 \$0.00 \$416.00							
ID	1.3.1.4.2 install new hardware in B0 third floor \$416.00 ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost													
5	Research Associate		16 hrs	0 days	Mon 1/10/05		•	\$0.00	\$0.00	\$416.00				
7	Students	100%	80 hrs	0 days	Mon 1/10/05	5 Fri 1/21/05	5 \$0.00	\$0.00	\$0.00	\$0.00				
1.3.1.4.3				test tl	he new hardw	are \$	3416.00							
ID	Resource Name	Units	Work	Delay	Start	Finish				Rem. Cost				
5 7	Research Associate Students	20% 100%	16 hrs 80 hrs	0 days 0 days	Mon 1/24/05 Mon 1/24/05		\$416.00 \$0.00	\$0.00 \$0.00	\$0.00 \$0.00	\$416.00 \$0.00				
1.3.1.4.4 1.3.1.5 Note	es	MS:	establish		ality of hardw ssion the syst		\$0.00 ,076.80							
Systen the sys	n commissioning is an intenstem.	ise task and l	has constrain	ts with othe	er systems. The t	wo students and t	he postdoc/resea	archer type have to wo	ork 100% of thei	r time to commission				
1.3.1.5.1 1.3.1.5.2	establis	h general	data flow		Q re-establisled and real da		\$0.00 \$416.00							
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost				
5 7	Research Associate Students	20%	16 hrs 80 hrs	0 days 0 days	Mon 2/14/05 Mon 2/14/05		•	\$0.00 \$0.00	\$0.00 \$0.00	\$416.00 \$0.00				
1.3.1.5.3	ance and optimize						,660.80	Ψ0.00	Ψ0.00	Ψ0.00				
ID	Resource Name	Units	Work	Dela		•	sh							
5 7	Research Associate Students	20%	140.8 hr 704 hr		,									
1	Siudenis	100%	704 111	s oua	ys IVIUI1 Z/Z0	5/05 Hid 6/3	50/05							

							_	
WBS			l	Name			Cost	
"test perfor	nance	e and optimize data flov	w softwa	re (simulated	l and real data)"	continued		
	ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost	
•	5	Research Associate	20%	\$3,660.80	\$0.00	\$0.00	\$3,660.80	-
	7	Students	100%	\$0.00	\$0.00	\$0.00	\$0.00	
1.3.1.	5.4	: establish system wit	h design	performance	e using simulated	l data	\$0.00	
1.3.1.	5.5	MS: establish syste	em with o	design perfor	mance using rea	l data	\$0.00	
1.	3.2		Сс	mputer for L	evel3 PC Farm /	DAQ \$	642,496.00	
	NIat							

Notes

Computer purchase is part of the operations but the cost is listed here for convenient tracking. We work with the assumption that every three years PCs become obsolete and have to be replaced.

The assumption is that a computer costs about \$1500. This number is probably going to be smaller since in the last years the computers have only gotten cheaper. Some farms group have bought computers recently for this price.

It is not useful to get a more detailed quote at this point since the prices are going to vary.

In terms of the human resources this project is rather light weight. The preparation work on the prototype takes 50% of the postdoc/researcher type plus 50% of one student. It takes two students 50% of their time supervised by a postdoc/researcher type to complete the installation and commissioning.

1.3.	2.1				repla	ace 70/15 PCs	s (2002) \$1	160,624.00			
1.3.2.	1.1			subm	it PO and	implementati	on plan \$1	160,000.00			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
-	2	FNALCont	100%	0 hrs	0 days	Mon 7/1/02	Mon 7/1/02	\$30,000.0	00 \$0.00	\$0.00	\$30,000.00
	3	FNALOP	100%	0 hrs	0 days	Mon 7/1/02	Mon 7/1/02	\$130,000.0	00 \$0.00	\$0.00	\$130,000.00
1.3.2. 1.3.2.				install a	nd test or	purchase form		\$0.00 \$416.00			
	ID	Resource Name	Un		ork De			sh Cos	st Baseline Cos	t Act. Cost	Rem. Cost
-	5	Research Associa	ite 20	0% 16	hrs 0 d	ays Mon 9/2	3/02 Fri 10/4	4/02 \$416.	.00 \$0.00	\$0.00	\$416.00
	7	Students	100	0% 80	hrs 0 d	ays Mon 9/2	.3/02 Fri 10/4	4/02 \$0.	.00 \$0.00	\$0.00	\$0.00
1.3.2. 1.3.2.				arrival	of 70/15	PCs from the	vendor n phase	\$0.00 \$0.00			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost A	ct. Cost Re	em. Cost
·	7	Students	50%	40 hrs	0 days	Fri 10/18/02	Thu 10/31/0	2 \$0.00	\$0.00	\$0.00	\$0.00

WBS Name Cost
1.3.2.1.6 installation into the level3 PC farm \$208.00
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
5 Research Associate 20% 8 hrs 0 days Fri 11/1/02 Thu 11/7/02 \$208.00 \$0.00 \$0.00 \$208.00
7 Students 100% 40 hrs 0 days Fri 11/1/02 Thu 11/7/02 \$0.00 \$0.00 \$0.00 \$0.00
1.3.2.2 replace 70/15 PCs (2003) \$160,624.00
· · · · · · · · · · · · · · · · · · ·
1.3.2.2.1 submit PO and implementation plan \$160,000.00
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
2 FNALCont 100% 0 hrs 0 days Tue 7/1/03 Tue 7/1/03 \$30,000.00 \$0.00 \$0.00 \$30,000.00
3 FNALOP 100% 0 hrs 0 days Tue 7/1/03 Tue 7/1/03 \$130,000.00 \$0.00 \$0.00 \$130,000.00
1.3.2.2.2 purchase formalities \$0.00
1.3.2.2.2 purchase formalities \$0.00
1.3.2.2.3 install and test one prototype machine \$416.00
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
5 Research Associate 20% 16 hrs 0 days Tue 9/23/03 Mon 10/6/03 \$416.00 \$0.00 \$0.00 \$416.00
7 Students 100% 80 hrs 0 days Tue 9/23/03 Mon 10/6/03 \$0.00 \$0.00 \$0.00 \$0.00
4.2.0.0.4
1.3.2.2.4 arrival of 70/15 PCs from the vendor \$0.00
1.3.2.2.5 burn in phase \$0.00
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
7 Students 50% 40 hrs 0 days Fri 10/17/03 Thu 10/30/03 \$0.00 \$0.00 \$0.00 \$0.00
1.3.2.2.6 installation into the level3 PC farm \$208.00
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
5 Research Associate 20% 8 hrs 0 days Fri 10/31/03 Thu 11/6/03 \$208.00 \$0.00 \$0.00 \$208.00
7 Students 100% 40 hrs 0 days Fri 10/31/03 Thu 11/6/03 \$0.00 \$0.00 \$0.00 \$0.00
1.3.2.3 replace 70/15 PCs (2004) \$160,624.00
1.3.2.3.1 submit PO and implementation plan \$160,000.00
ID Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
2 FNALCont 100% 0 hrs 0 days Thu 7/1/04 Thu 7/1/04 \$30,000.00 \$0.00 \$0.00 \$30,000.00
3 FNALOP 100% 0 hrs 0 days Thu 7/1/04 Thu 7/1/04 \$130,000.00 \$0.00 \$0.00 \$130,000.00
1.3.2.3.2 purchase formalities \$0.00

WBS		N	ame			Cos	†			
1.3.2.3.3				st one pr	ototype mach		16.00			
ID	Resource Name	Units		Delay	Start	Finish	Cost	Baseline Cos	t Act. Cost	Rem. Cost
5	Research Associate	20%		0 days	Thu 9/23/04	Wed 10/6/04	4 \$416.00	\$0.00	\$0.00	\$416.00
7	Students	100%	80 hrs	0 days	Thu 9/23/04	Wed 10/6/04	4 \$0.00	\$0.00	\$0.00	\$0.00
1.3.2.3.4		orri	val of 70	\/15 DCc	from the ven	dor	\$0.00			
		aiii	vai Oi 70	// 13 F GS						
1.3.2.3.5					burn in pha		\$0.00			
ID		nits Wo			Start	Finish				m. Cost
7	Students 5	60% 40 h	irs 0 da	ays Mo	n 10/18/04	Fri 10/29/04	\$0.00	\$0.00	\$0.00	\$0.00
1.3.2.3.6		ii	nstallatio	n into the	e level3 PC fa	ırm \$2	208.00			
ID	Resource Name			Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
5	Research Associate	20%		0 days		Fri 11/5/04	\$208.00	\$0.00	\$0.00	\$208.00
7	Students			,		Fri 11/5/04	\$0.00	\$0.00	\$0.00	\$0.00
1.3.2.4			r	eplace 7	0/15 PCs (20	05) \$160,6	624.00			
1.3.2.4.1		su	bmit PO	and imp	lementation p	lan \$160,0	00.00			
ID	Resource Name U	nits Wo	rk Dela	ay S	Start Fir	nish Co	st Bas	seline Cost Ac	t. Cost Re	em. Cost
2		00% 0 h				/1/05 \$30,0		\$0.00	•	30,000.00
3	FNALOP 10	00% 0 h	rs 0 da	ıys Fri	7/1/05 Fri 7	/1/05 \$130,0	00.00	\$0.00	\$0.00 \$13	30,000.00
1.3.2.4.2				nur	chase formalit	ies	\$0.00			
1.3.2.4.3				•	ototype mach	·	16.00		_	
<u>ID</u>	Resource Name	Units		Delay	Start	Finish		Baseline Cost	Act. Cost	Rem. Cost
5	Research Associate			0 days	Fri 9/23/05	Thu 10/6/05	\$416.00	\$0.00	\$0.00	\$416.00
7	Students	100%	80 hrs	0 days	Fri 9/23/05	Thu 10/6/05	\$0.00	\$0.00	\$0.00	\$0.00
1.3.2.4.4		arri	val of 70)/15 PCs	from the ven	dor	\$0.00			
1.3.2.4.5					burn in pha	ise	\$0.00			
ID	Resource Name U	nits Wo	rk Del	ay	Start	Finish	Cost Bas	seline Cost Ac	t. Cost Rei	m. Cost
7	Students 5	60% 40 h	rs 0 da	ays Mo	n 10/17/05	Fri 10/28/05	\$0.00	\$0.00	\$0.00	\$0.00
1.3.2.4.6		i	netallatio	n into the	e level3 PC fa	ırm ¢2	208.00			
		"	istaliatio			IIII Ψ∠	.00.00			
ID	Resource Name			Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost

WBS			Name				Cost					
"installation into	the level3 PC farm	" continu										
_ID	Resource Name	Unit					nish	Cost	Baseline		Act. Cost	Rem. Cost
7	Students	100	% 40 hr	s 0 days	s Mon 10/31	1/05 Fri 1 <i>1</i>	1/4/05	\$0.00		\$0.00	\$0.00	\$0.00
1.4				Cal	lorimeter upgi	rades \$	204,480.	00				
1.4.1				Elec	tromagnetic ti	iming \$	204,480.	.00				
1.4.1.1				Research	and Develop	ment	\$0.	.00				
1.4.1.1.1				Pro	ototype Test S	Stand	\$0.	00				
1.4.1.1.1.1					TDC E		\$0.					
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline	Cost	Act. Cost	Rem. C	ost
3	Texas A&MEQ	10%	48 hrs (0 days N	Mon 4/15/02	Fri 7/5/02	\$0.00		\$0.00	\$0.00	\$0	.00
1.4.1.1.1.2					ASD E	Board	\$0.	.00				
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline	Cost	Act. Cost	Rem. C	ost
3	Texas A&MEQ	10%	48 hrs (0 days N	Mon 4/15/02	Fri 7/5/02	\$0.00		\$0.00	\$0.00	\$0	.00
1.4.1.1.1.4				PMT	with modified	base	\$0.	.00				
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline	Cost	Act. Cost	Rem. C	ost
4	Texas A&MRD	20%	96 hrs (0 days N	Mon 4/15/02	Fri 7/5/02	\$0.00		\$0.00	\$0.00	\$0	.00
1.4.1.1.9				Test /	ASD->TDC C	ables	\$0.	.00				
Note												
Test ca	ables if they can carry a	signal to TD	C before ord	ering								
1.4.1.1.9.1					Test 2 Proto		\$0.					
_ID	Resource Name			Delay	Start	Finish	Cost	Baseline		Act. Cost		
4	Texas A&MRD	50%	40 hrs (0 days N	Mon 7/8/02 I	Fri 7/19/02	\$0.00	;	\$0.00	\$0.00	\$0	.00
1.4.1.1.9.3					Test CEM C	ables	\$0.	.00				
_ID	Resource Name	Units	Work	Delay	Start	Finish			eline Cos			m. Cost
4	Texas A&MRD	100%	320 hrs	0 days	Mon 9/30/02	Fri 11/22	/02 \$0	.00	\$0.0	0 \$	0.00	\$0.00
1.4.1.1.9.4					Test PEM C	ables	\$0.	.00				
ID	Resource Name	Units	Work	Delay	Start	Finish	ı Co	ost Base	eline Cos	st Act.	Cost Re	m. Cost
4	Texas A&MRD	100%	320 hrs	0 days	Mon 9/30/02	Fri 11/22	/02 \$0	.00	\$0.0	0 \$	0.00	\$0.00

WBS				Name			C	ost				
1.4.1.1.1	n			Hame		Test ASD Sys		\$0.00				
1.4.1.1.10						Test ASD B		\$0.00				
	D Resource	Name	Units	Work	Delay	Start	Finish	-	Baseline Cost	Act. Cost	Rem. Cost	
	4 Texas A&I	MRD	100%	320 hrs	0 days	Mon 3/3/03	Fri 4/25/03	\$0.00	\$0.00	\$0.00	\$0.00	
	Notes											
Te	st 10 Boards											
1.4.1.1.10	2				Т	est 2nd ASD B	atch	\$0.00				
<u> </u>	D Resource		Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	4 Texas A&I	MRD	100%	320 hrs	0 days	Mon 4/28/03	Fri 6/20/03	\$0.00	\$0.00	\$0.00	\$0.00	
	Notes											
20	Boards are at Fern	niLab										
1.4.1.1.10	.3				Τ	est 3rd ASD B	atch	\$0.00				
<u> </u>	D Resource	Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	4 Texas A&I	MRD	100%	320 hrs	0 days	Mon 6/23/03	Fri 8/15/03	\$0.00	\$0.00	\$0.00	\$0.00	
	Notes											
30	Boards are at Fern	ni Lab										
1.4.1.1.10	.4				Γ	Test 4th ASD B	atch	\$0.00				
<u>_ I</u>	D Resource		Units	Work	Delay	Start	Finish	Cost				
	4 Texas A&I	MRD	100%	320 hrs	0 days	Mon 8/18/03	Fri 10/10/03	\$0.00	\$0.00	\$0.00	\$0.00	
1	Notes											
Te	sted all 40 Boards											
1.4.1.1.1	2					Test TDC Bo	ards	\$0.00				
1.4.1.1.12	.1				Tes	t CEM TDC Bo	ards	\$0.00				
<u> </u>	D Resource		Units	Work	Delay	Start	Finish	Cost	Baseline Cost			
	4 Texas A&I	MRD	100%	160 hrs	0 days	Tue 6/17/03	Mon 7/14/03	\$0.00	\$0.00	\$0.00	\$0.00	
1.4.1.1.12	5				Tes	t PEM TDC Bo	ards	\$0.00				
I	D Resource	Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	4 Texas A&I	MRD	100%	160 hrs	0 days	Tue 7/15/03	Mon 8/11/03	\$0.00	\$0.00	\$0.00	\$0.00	

WBS			Nam	16			Cost			
1.4.1.2			INGII		Droot	ıra narta — (
							\$204,480.00			
1.4.1.2.1							\$29,744.00			
1.4.1.2.1.5				_	o Connectors f	-	\$12,102.00			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Co		
3	Texas A&MEQ	0%	0 hrs	0 days	Mon 4/15/02	Mon 4/15/0)2 \$12,102.0	00 \$0.0	00 \$0.	00 \$12,102.00
1.4.1.2.1.6				M Lem	o Connectors t	for PEM	\$6,051.00			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	t Act. Cos	st Rem. Cost
3	Texas A&MEQ	0%	0 hrs	0 days	Mon 4/15/02	Mon 4/15/0	2 \$6,051.00	0.00\$	\$0.0	0 \$6,051.00
1.4.1.2.1.7				F Lemo	o Connectors f	for CEM	\$6,051.00			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos		
3	Texas A&MEQ	0%	0 hrs	0 days	Mon 4/15/02	Mon 4/15/0	2 \$6,051.00	0.00\$	\$0.0	0 \$6,051.00
1.4.1.2.1.9				AMP Co	nnector Parts t	for PEM	\$5,540.00			
<u>ID</u>	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	t Act. Cos	st Rem. Cost
3	Texas A&MEQ	0%	0 hrs	0 days	Mon 4/15/02	Mon 4/15/0)2 \$5,540.00	0.00\$	\$0.0	0 \$5,540.00
1.4.1.2.2						Cables	\$22,536.00			
1.4.1.2.2.3					CEM ASD		\$13,856.00			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
3	Texas A&MEQ	0%	0 hrs	0 days	Fri 7/19/02	Fri 7/19/02	\$13,856.00	\$0.00	\$0.00	\$13,856.00
1.4.1.2.2.4					PEM ASD	to TDC	\$8,680.00			
_ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
3	Texas A&MEQ	0%	0 hrs	0 days	Fri 7/19/02	Fri 7/19/02	\$8,680.00	\$0.00	\$0.00	\$8,680.00
1.4.1.2.3					Ele	ectronics \$	\$152,200.00			
1.4.1.2.3.13				Build CF	EM+PEM ASD) Boards	\$60,000.00			
1.4.1.2.3.13.3						nd Batch	\$15,000.00			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	ItalyEQ	0%	0 hrs	0 days	Fri 2/28/03	Fri 2/28/03	\$15,000.00	\$0.00	\$0.00	\$15,000.00
No			_							
20 Bo	pards are at FermiLab									

WBS			Nam	е			Cost			
1.4.1.2.3.13.4					3	rd Batch	\$15,000.00			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	ItalyEQ	0%	0 hrs	0 days	Fri 4/11/03	Fri 4/11/03	\$15,000.00	\$0.00	\$0.00	\$15,000.00
No:	tes pards are at Fermi Lab		<u>-</u> ,							
30 BC	oards are at Fermi Lab									
1.4.1.2.3.13.5					1	st Batch	\$15,000.00			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	ItalyEQ	0%	0 hrs	0 days	Fri 1/17/03	Fri 1/17/03	\$15,000.00	\$0.00	\$0.00	\$15,000.00
No	tes									
First '	10 Boards are at FermiLal)	-							
1.4.1.2.3.13.6					4	th Batch	\$15,000.00			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	ItalyEQ	0%	0 hrs	0 days	Fri 5/23/03	Fri 5/23/03	\$15,000.00	\$0.00	\$0.00	\$15,000.00
No	tes									
All 40	Boards are at FermiLab		-							
1.4.1.2.3.18			Ruila	√ЕМ±Р	EM Transition	n Boards	\$19,600.00			
			Dunc	J CLIVITI						
.4.1.2.3.18.12	_					st Batch	\$4,900.00			
<u>ID</u>	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	ItalyEQ	0%	0 hrs	0 days	Fri 1/17/03	Fri 1/17/03	\$4,900.00	\$0.00	\$0.00	\$4,900.00
_No			_							
First '	10 Boards are at FermiLal)								
.4.1.2.3.18.13					2	nd Batch	\$4,900.00			
_ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	ItalyEQ	0%	0 hrs	0 days	Fri 2/28/03	Fri 2/28/03	\$4,900.00	\$0.00	\$0.00	\$4,900.00
No	tes									
20 Bc	pards are at FermiLab		-							
.4.1.2.3.18.14					3	rd Batch	\$4,900.00			
ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
2	ItalyEQ	0%	0 hrs	0 days	Fri 4/11/03	Fri 4/11/03	\$4,900.00	\$0.00	\$0.00	\$4,900.00

WBS				Nam	ıe			Cost			
"3rd Batch"	conti	nued									
	Note										
_		rds are at Fermi Lab		-							
.4.1.2.3.18.	15					4t	h Batch	\$4,900.00			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost A	Act. Cost I	Rem. Cost
_	2	ItalyEQ	0%	0 hrs	0 days	Fri 5/23/03	Fri 5/23/03	\$4,900.00	\$0.00	\$0.00	\$4,900.00
	Note	es									
Ā	II 40 E	Boards are at FermiLab		-							
1.4.1.2.3.	27					VME Crate - fi	irst floor 9	\$15,000.00			
1.4.1.2.3.2							Crate	\$5,000.00			
_	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	3	Texas A&MEQ	0%	0 hrs	0 days	Mon 4/19/04	Mon 4/19/04	\$5,000.00	\$0.00	\$0.00	\$5,000.00
1.4.1.2.3.2	7.2					Pr	ocessor	\$2,500.00			
_	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost		
	3	Texas A&MEQ	0%	0 hrs	0 days	Mon 4/19/04	Mon 4/19/04	\$2,500.00	\$0.00	\$0.00	\$2,500.00
1.4.1.2.3.2	7.3						Tracer	\$5,000.00			
_	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	3	Texas A&MEQ	0%	0 hrs	0 days	Mon 4/19/04	Mon 4/19/04	\$5,000.00	\$0.00	\$0.00	\$5,000.00
1.4.1.2.3.2	7.4					Power	· Supply	\$2,500.00			
_	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost		
	3	Texas A&MEQ	0%	0 hrs	0 days	Mon 4/19/04	Mon 4/19/04	\$2,500.00	\$0.00	\$0.00	\$2,500.00
1.4.1.2.3.	33					TDC	Boards \$	\$57,600.00			
1.4.1.2.3.33	3.1					CEM TDC	Boards S	\$33,600.00			
_	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	st Act. Co	st Rem. Cost
_	3	Texas A&MEQ	0%	0 hrs	0 days	Mon 5/19/03	Mon 5/19/03	3 \$33,600.0	00 \$0.0	0 \$0.0	0 \$33,600.00
1.4.1.2.3.33	3.2					PEM TDC	Boards \$	\$24,000.00			
_	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	st Act. Co	
_	3	Texas A&MEQ	0%	0 hrs	0 days	Mon 5/19/03	Mon 5/19/03	\$24,000.0	00 \$0.0	0 \$0.0	0 \$24,000.00

WBS Name Cost	
1.4.1.11 PAC Approval \$0.00	
1.4.1.20 Italian Government Approval \$0.00	
Notes	
Project has to be approved by Italian Government	
1.8 Installation of Run IIb \$555,437.00	
1.8.1 Roll Out From Run 2A \$44,205.60	
1.8.1.1.1 End of Run 2A Drop Interlocks \$0.00	
1.8.1.1.2 Open up all muon shielding \$1,386.80	
ID Resource Name Units Work Delay Start Finish	
3 Mech. Engineer II 100% 8 hrs 0 days Wed 4/13/05 Wed 4/13/05	
4 Mech. Technician II 400% 32 hrs 0 days Wed 4/13/05 Wed 4/13/05	
5 Mech. Technical Specialist 100% 8 hrs 0 days Wed 4/13/05 Wed 4/13/05	
ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost	
3 Mech. Engineer II 100% \$338.80 \$0.00 \$0.00 \$338.80	
4 Mech. Technician II 400% \$736.00 \$0.00 \$736.00	
5 Mech. Technical Specialist 100% \$312.00 \$0.00 \$0.00 \$312.00	
1.8.1.1.3 Remove polyethelene bags \$368.00	
ID Resource Name Units Work Delay Start Finish	
4 Mech. Technician II 200% 16 hrs 0 days Wed 4/13/05 Wed 4/13/05	
5 Mech. Technical Specialist 50% 0 hrs 0 days Wed 4/13/05 Wed 4/13/05	
ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost	
4 Mech. Technician II 200% \$368.00 \$0.00 \$0.00 \$368.00	
5 Mech. Technical Specialist 50% \$0.00 \$0.00 \$0.00 \$0.00	
1.8.1.1.4 Turn off flammable gas and begin nitrogen purge \$1,048.00	
ID Resource Name Units Work Delay Start Finish	
4 Mech. Technician II 200% 32 hrs 0 days Wed 4/13/05 Thu 4/14/05	
5 Mech. Technical Specialist 50% 8 hrs 0 days Wed 4/13/05 Thu 4/14/05	
ID Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost	
4 Mech. Technician II 200% \$736.00 \$0.00 \$0.00 \$736.00	
5 Mech. Technical Specialist 50% \$312.00 \$0.00 \$0.00 \$312.00	

WBS		Name		Cost	t			
1.8.1.1.5			Warm up Sole		08.00			
ID	Resource Name	Units Work	•		inish			
3	Mech. Engineer II	100% 80 hrs			4/26/05			
4	Mech. Technician II	100% 80 hrs	,		4/26/05			
5	Mech. Technical Specialist	100% 20 hrs	•		4/15/05			
ID	Resource Name	Units Co	st Baseline	Cost Act. Cost	Rem. Cost			
3	Mech. Engineer II	100% \$3,38	8.00 \$	0.00 \$0.00	\$3,388.00	_		
4	Mech. Technician II	100% \$1,84	0.00 \$	0.00 \$0.00	\$1,840.00			
5	Mech. Technical Specialist	100% \$78	80.00 \$	0.00 \$0.00	\$780.00			
1.8.1.1.6			Warm up Sil	icon \$1,0	48.00			
ID	Resource Name	Units Work			inish			
4	Mech. Technician II	200% 32 hrs			4/14/05			
5	Mech. Technical Specialist	50% 8 hrs			4/14/05			
ID	Resource Name	Units Cos	st Baseline Co	st Act. Cost	Rem. Cost			
4	Mech. Technician II	200% \$736.	.00 \$0.	00.00	\$736.00			
5	Mech. Technical Specialist	50% \$312.	.00 \$0.	00.00	\$312.00			
1.8.1.1.7		Disconne	ct silicon DAQ ca	bles \$1,8	40.00			
ID	Resource Name Units	Work Del	ay Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
4	Mech. Technician II 400%	80 hrs 0 da	ays Wed 4/13/0	5 Fri 4/15/05	\$1,840.00	\$0.00	\$0.00	\$1,840.00
No	tes							
	ple 2 days/rack 8 racks or 16 2 people		-1					
2 day	s to prep work, install bracketry for cable	es to nang and ride a	along on the detector					
1.8.1.1.8	Drain	and disconnect	Silicon Cooling I	ines \$5	24.00			
<u>ID</u>	Resource Name	Units Work		tart Finis				
4	Mech. Technician II	200% 16 hrs	s 0 days Fri∠	/15/05 Fri 4/1	5/05			
5	Mech. Technical Specialist	50% 4 hrs	s 0 days Fri⊿	/15/05 Fri 4/1	5/05			
<u>ID</u>	Resource Name	Units Cos		st Act. Cost	Rem. Cost			
4	Mech. Technician II	200% \$368.	•	·	\$368.00			
5	Mech. Technical Specialist	50% \$156.	.00 \$0.	00 \$0.00	\$156.00			

WBS				Name					Cos	et			
1.8.1.1	9			1 tarrio	Disc	connect (ervo pip	es		524.00			
	ID	Resource Name		Units	Work	Delay		art	•	Finish			
_	4	Mech. Technician II		200%	16 hrs	0 days		1/27/05		d 4/27/05	_		
	5	Mech. Technical Spec	cialist	50%	4 hrs	0 days	Wed 4			d 4/27/05			
	ID	Resource Name		Units	Cost	•	ne Cost		Cost	Rem. Co	ost		
_	4	Mech. Technician II		200%	\$368.00		\$0.00) ;	\$0.00	\$368.	00		
	5	Mech. Technical Spec	cialist	50%	\$156.00		\$0.00) :	\$0.00	\$156.	00		
1.8.1.1.	10				Discor	nect arg	on ethai	ne	\$:	524.00			
	ID	Resource Name		Units	Work	Delay	Sta	art	Fi	nish			
-	4	Mech. Technician II		200%	16 hrs	0 days	Thu 4/	/28/05	Thu -	4/28/05			
	5	Mech. Technical Spec	cialist	50%	4 hrs	0 days	Thu 4/	28/05	Thu	4/28/05			
	ID	Resource Name		Units	Cost	Baseli	ne Cost	t Act.	Cost	Rem. Co	ost		
_	4	Mech. Technician II		200%	\$368.00		\$0.00) ;	\$0.00	\$368.	00		
	5	Mech. Technical Spec	cialist	50%	\$156.00		\$0.00) :	\$0.00	\$156.	00		
1.8.1.1.	11	Res	:Hrvev i	detector	and low b	eta quac	l magne	ıte		\$0.00			
			oui v Gy i	detector					Φ.				
1.8.1.1.		December No.		11-26-		nect wat	•		•	524.00			
_	ID	Resource Name		Units	Work	Delay	Sta		Fini				
	4	Mech. Technician II	oioliot	200%	16 hrs	0 days	Fri 4/2		Fri 4/2				
	5	Mech. Technical Spe	cialist	50%	4 hrs	0 days	Fri 4/2		Fri 4/2				
<u>_</u>	ID	Resource Name		Units	Cost					Rem. Co			
	4	Mech. Technician II		200%	\$368.00		\$0.00		\$0.00	\$368.			
	5	Mech. Technical Spe	cialist	50%	\$156.00		\$0.00) :	\$0.00	\$156.	00		
1.8.1.1.	13				Dis	connect	AC pow	er	\$	184.00			
_	ID	Resource Name	Units	Work	Delay	Sta	rt	Finis		Cost	Baseline Cost	Act. Cost	Rem. Cost
_	4	Mech. Technician II	100%	8 hrs	0 days	Mon 5	/2/05	Mon 5/	2/05	\$184.00	\$0.00	\$0.00	\$184.00
1.8.1.1.	14				Disco	onnect M	isc cabl	es	\$7	736.00			
	ID	Resource Name	Units	Work	Delay	Sta	art	Fini	sh	Cost	Baseline Cost	Act. Cost	Rem. Cost
-	4	Mech. Technician II	200%	32 hrs	0 days	Tue 5	/3/05	Wed 5	/4/05	\$736.00	\$0.00	\$0.00	\$736.00
	Not	es											
_	ahlas	include clock muon chamber	re in kave	tone muon	chambers i	n north nor	ch muon :	and centr	al datact	or arounding	strans camera in unr	er notch TOF	clock miniplya clock etc

cables include clock, muon chambers in keystone, muon chambers in north porch, muon and central detector grounding straps, camera in upper notch, TOF clock, miniplug clock, etc

WBS			Name			Coot
			iname			Cost
	3.1.2				Roll out Process	\$29,490.80
1.8.1	1.2.1		R	emove 30 d	degree miniskirts	\$2,773.60
	ID	Resource Name	Units		Delay Start	Finish
	3	Mech. Engineer II	100%		days Thu 4/14/05	
	4	Mech. Technician II	400%		days Thu 4/14/05	
	5	Mech. Technical Specialist	100%	16 hrs 0	days Thu 4/14/05	Fri 4/15/05
	ID	Resource Name	Units	Cost		Act. Cost Rem. Cost
	3	Mech. Engineer II	100%	\$677.60		\$0.00 \$677.60
	4	Mech. Technician II	400%	\$1,472.00		\$0.00 \$1,472.00
	5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00 \$624.00
1.8.1	1.2.2				Open Endplugs	\$2,773.60
	ID	Resource Name	Units	Work D	Delay Start	Finish
	3	Mech. Engineer II	100%	16 hrs 0	days Mon 4/18/05	5 Tue 4/19/05
	4	Mech. Technician II	400%		days Mon 4/18/05	
	5	Mech. Technical Specialist	100%	16 hrs 0	days Mon 4/18/05	5 Tue 4/19/05
	ID	Resource Name	Units	Cost		Act. Cost Rem. Cost
	3	Mech. Engineer II	100%	\$677.60		\$0.00 \$677.60
	4	Mech. Technician II	400%	\$1,472.00		\$0.00 \$1,472.00
	5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00 \$624.00
1.8.1		Mech. Technical Specialist			\$0.00 tron connections	\$0.00 \$624.00 \$1,386.80
1.8.1		Resource Name		Break Tevat		
1.8.1	1.2.3	Resource Name Mech. Engineer II	Units 100%	Break Tevat Work D 8 hrs 0	tron connections Delay Start days Wed 4/20/09	\$1,386.80 Finish 5 Wed 4/20/05
1.8.1	I.2.3 ID 3 4	Resource Name Mech. Engineer II Mech. Technician II	Units 100% 400%	Break Tevat Work D 8 hrs 0 32 hrs 0	tron connections Delay Start days Wed 4/20/09 days Wed 4/20/09	\$1,386.80 Finish 5 Wed 4/20/05 5 Wed 4/20/05
1.8.1	1.2.3 ID 3	Resource Name Mech. Engineer II	Units 100%	Break Tevat Work D 8 hrs 0 32 hrs 0	tron connections Delay Start days Wed 4/20/09	\$1,386.80 Finish 5 Wed 4/20/05 5 Wed 4/20/05
1.8.1	I.2.3 ID 3 4 5 ID	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name	Units 100% 400% 100% Units	Break Tevat Work E 8 hrs 0 32 hrs 0 8 hrs 0 Cost	tron connections Delay Start days Wed 4/20/09 days Wed 4/20/09 days Wed 4/20/09 Baseline Cost Ac	\$1,386.80 Finish 5 Wed 4/20/05 5 Wed 4/20/05 5 Wed 4/20/05 t. Cost Rem. Cost
1.8.1	I.2.3 ID 3 4 5 ID 3	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II	Units 100% 400% 100% Units 100%	Break Tevat Work	tron connections Delay Start days Wed 4/20/09 days Wed 4/20/09 days Wed 4/20/09 Baseline Cost Ac \$0.00	\$1,386.80 Finish Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 t. Cost Rem. Cost \$0.00 \$338.80
1.8.1	I.2.3 ID 3 4 5 ID 3 4	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II	Units 100% 400% 100% Units 100% 400%	Break Tevat Work E 8 hrs 0 32 hrs 0 8 hrs 0 Cost \$338.80 \$736.00	tron connections Delay Start Odays Wed 4/20/09 Odays Wed 4/20/09 Odays Wed 4/20/09 Baseline Cost Ac \$0.00 \$0.00	\$1,386.80 Finish Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 t. Cost Rem. Cost \$0.00 \$338.80 \$0.00 \$736.00
1.8.1	I.2.3 ID 3 4 5 ID 3	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II	Units 100% 400% 100% Units 100%	Break Tevat Work	tron connections Delay Start days Wed 4/20/09 days Wed 4/20/09 days Wed 4/20/09 Baseline Cost Ac \$0.00	\$1,386.80 Finish Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 t. Cost Rem. Cost \$0.00 \$338.80
1.8.1	1.2.3 ID 3 4 5 ID 3 4 5	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II	Units 100% 400% 100% Units 100% 400%	Break Tevat Work E 8 hrs 0 32 hrs 0 8 hrs 0 Cost \$338.80 \$736.00 \$312.00	tron connections Delay Start Odays Wed 4/20/09 Odays Wed 4/20/09 Odays Wed 4/20/09 Baseline Cost Ac \$0.00 \$0.00	\$1,386.80 Finish Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 t. Cost Rem. Cost \$0.00 \$338.80 \$0.00 \$736.00
	1.2.3 ID 3 4 5 ID 3 4 5	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II	Units 100% 400% 100% Units 100% 400%	Break Tevat Work	tron connections Delay Start Odays Wed 4/20/09 Odays Wed 4/20/09 Odays Wed 4/20/09 Baseline Cost Ac \$0.00 \$0.00 \$0.00	\$1,386.80 Finish Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 t. Cost Rem. Cost \$0.00 \$338.80 \$0.00 \$736.00 \$0.00 \$312.00
	I.2.3 ID 3 4 5 ID 3 4 5	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technician II Mech. Technical Specialist	Units 100% 400% 100% Units 100% 400% 100%	Break Tevat Work	tron connections Delay Start days Wed 4/20/09 days Wed 4/20/09 days Wed 4/20/09 Baseline Cost Act \$0.00 \$0.00 \$0.00	\$1,386.80 Finish Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 t. Cost Rem. Cost \$0.00 \$338.80 \$0.00 \$736.00 \$0.00 \$312.00 \$2,773.60 Finish
	I.2.3 ID 3 4 5 ID 3 4 5 ID	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technician II Mech. Technical Specialist Resource Name	Units 100% 400% 100% Units 100% 400% 100%	Break Tevat Work	tron connections Delay Start days Wed 4/20/09 days Wed 4/20/09 days Wed 4/20/09 Baseline Cost Act \$0.00 \$0.00 \$0.00 move mini plugs Delay Start	\$1,386.80 Finish Wed 4/20/05 Wed 4/20/05 Wed 4/20/05 **Cost Rem. Cost \$0.00 \$338.80 \$0.00 \$736.00 \$0.00 \$312.00 \$2,773.60 Finish Fri 4/22/05

WBS		Name Cost
"Remove mini p	oluas" continued	Traine Cost
ID	Resource Name	Units Work Delay Start Finish
5	Mech. Technical Specialist	100% 16 hrs 0 days Thu 4/21/05 Fri 4/22/05
ID	Resource Name	Units Cost Baseline Cost Act. Cost Rem. Cost
3	Mech. Engineer II	100% \$677.60 \$0.00 \$0.00 \$677.60
4	Mech. Technician II	400% \$1,472.00 \$0.00 \$0.00 \$1,472.00
5	Mech. Technical Specialist	100% \$624.00 \$0.00 \$0.00 \$624.00
1.8.1.2.5		Close Plugs \$1,386.80
ID	Resource Name	Units Work Delay Start Finish
3	Mech. Engineer II	100% 8 hrs 0 days Mon 4/25/05 Mon 4/25/05
4	Mech. Technician II	400% 32 hrs 0 days Mon 4/25/05 Mon 4/25/05
5	Mech. Technical Specialist	100% 8 hrs 0 days Mon 4/25/05 Mon 4/25/05
ID	Resource Name	Units Cost Baseline Cost Act. Cost Rem. Cost
3	Mech. Engineer II	100% \$338.80 \$0.00 \$0.00 \$338.80
4	Mech. Technician II	400% \$736.00 \$0.00 \$0.00 \$736.00
5	Mech. Technical Specialist	100% \$312.00 \$0.00 \$0.00 \$312.00
1.8.1.2.6		Remove plug rails \$1,386.80
ID	Resource Name	Units Work Delay Start Finish
3	Mech. Engineer II	100% 8 hrs 0 days Tue 4/26/05 Tue 4/26/05
4	Mech. Technician II	400% 32 hrs 0 days Tue 4/26/05 Tue 4/26/05
5	Mech. Technical Specialist	100% 8 hrs 0 days Tue 4/26/05 Tue 4/26/05
ID	Resource Name	Units Cost Baseline Cost Act. Cost Rem. Cost
3	Mech. Engineer II	100% \$338.80 \$0.00 \$0.00 \$338.80
4	Mech. Technician II	400% \$736.00 \$0.00 \$0.00 \$736.00
5	Mech. Technical Specialist	100% \$312.00 \$0.00 \$0.00 \$312.00
1.8.1.2.7	Discon	nect North CMP wall from 1200 door \$1,386.80
ID	Resource Name	Units Work Delay Start Finish
3	Mech. Engineer II	100% 8 hrs 0 days Wed 4/27/05 Wed 4/27/05
4	Mech. Technician II	400% 32 hrs 0 days Wed 4/27/05 Wed 4/27/05
5	Mech. Technical Specialist	100% 8 hrs 0 days Wed 4/27/05 Wed 4/27/05
ID	Resource Name	Units Cost Baseline Cost Act. Cost Rem. Cost
3	Mech. Engineer II	100% \$338.80 \$0.00 \$0.00 \$338.80

WBS		Name			Cos	st			
	th CMP wall from 1200 door" o		-						
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost			
4	Mech. Technician II	400%	\$736.00	\$0.00	\$0.00	\$736.00			
5	Mech. Technical Specialist	100%	\$312.00	\$0.00	\$0.00	\$312.00			
1.8.1.2.8		O	pen 1200	ton door and park	ς \$2,7	773.60			
ID	Resource Name	Units	Work	Delay Star	t Fir	nish			
3	Mech. Engineer II	100%		0 days Thu 4/2		/29/05			
4	Mech. Technician II	400%		0 days Thu 4/2		/29/05			
5	Mech. Technical Specialist	100%	16 hrs	0 days Thu 4/2	8/05 Fri 4	/29/05			
ID	Resource Name	Units	Cost	Baseline Cos					
3	Mech. Engineer II	100%	\$677.6						
4	Mech. Technician II	400%	\$1,472.0						
5	Mech. Technical Specialist	100%	\$624.0	00 \$0.00) \$0.00	3 \$624.00			
1.8.1.2.9	Restacl	k CMP S	cintillator	on top of detecto	r \$3	368.00			
ID	Resource Name Units	Work		Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
4	Mech. Technician II 200%	16 hrs	0 days	Wed 4/13/05	Wed 4/13/0	05 \$368.00	\$0.00	\$0.00	\$368.00
-	11100111 1 001111101011 11		0 0.0., 0			*	¥ 0.00	40.00	*
1.8.1.2.10	20070			North Muon Wal		934.00			
- 	Resource Name	Units			l \$6,9				
1.8.1.2.10			Remove	North Muon Wal	l \$6,9 urt Fir	934.00			
1.8.1.2.10 <u>ID</u>	Resource Name	Units	Remove Work	North Muon Wal	I \$6,9 urt Fir /2/05 Fri 5	934.00 nish			•
1.8.1.2.10 <u>ID</u> 3	Resource Name Mech. Engineer II	Units 100%	Remove Work 40 hrs	North Muon Wal Delay Sta 0 days Mon 5	I \$6,9 ort Fir /2/05 Fri 5 /2/05 Fri 5	934.00 nish 5/6/05			
1.8.1.2.10 ID 3 4	Resource Name Mech. Engineer II Mech. Technician II	Units 100% 400%	Remove Work 40 hrs 160 hrs	North Muon Wal Delay Sta 0 days Mon 5, 0 days Mon 5	I \$6,9 art Fir /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5	934.00 nish 5/6/05 5/6/05			,
1.8.1.2.10 ID 3 4 5	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist	Units 100% 400% 100%	Remove Work 40 hrs 160 hrs 40 hrs	North Muon Wal Delay Sta 0 days Mon 5, 0 days Mon 5, 0 days Mon 5, Baseline Cos	I \$6,9 hrt Fir /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 ht Act. Cos	934.00 nish 5/6/05 5/6/05 5/6/05 st Rem. Cost	_		
1.8.1.2.10 ID 3 4 5 ID 3 4 5 4 5	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II	Units 100% 400% 100% Units 100% 400%	Remove Work 40 hrs 160 hrs 40 hrs Cost \$1,694.0 \$3,680.0	North Muon Wal Delay Sta 0 days Mon 5, 0 days Mon 5, 0 days Mon 5, Baseline Cos 0 \$0.00	I \$6,9 or Fir /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 or Act. Cos 0 \$0.00 0 \$0.00	934.00 hish 5/6/05 5/6/05 bt Rem. Cost 0 \$1,694.00 0 \$3,680.00	_		
1.8.1.2.10 ID 3 4 5 ID 3	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II	Units 100% 400% 100% Units 100%	Remove Work 40 hrs 160 hrs 40 hrs Cost \$1,694.0	North Muon Wal Delay Sta O days Mon 5, O days Mon 5, O days Mon 5, Baseline Cos O \$0.00	I \$6,9 or Fir /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 or Act. Cos 0 \$0.00 0 \$0.00	934.00 hish 5/6/05 5/6/05 bt Rem. Cost 0 \$1,694.00 0 \$3,680.00	_		
1.8.1.2.10 ID 3 4 5 ID 3 4 5 4 5	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technicial Specialist	Units 100% 400% 100% Units 100% 400% 100%	Remove Work 40 hrs 160 hrs 40 hrs Cost \$1,694.0 \$3,680.0 \$1,560.0	North Muon Wal Delay Sta 0 days Mon 5, 0 days Mon 5, 0 days Mon 5, Baseline Cos 0 \$0.00	I \$6,9 or Fir 1/2/05 Fri 5 1/	934.00 hish 5/6/05 5/6/05 5/6/05 st Rem. Cost 0 \$1,694.00 0 \$3,680.00 0 \$1,560.00	_		
1.8.1.2.10 ID 3 4 5 ID 3 4 5	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technicial Specialist	Units 100% 400% 100% Units 100% 400% 100%	Remove Work 40 hrs 160 hrs 40 hrs Cost \$1,694.0 \$3,680.0 \$1,560.0	Poorth Muon Wale Delay O days O days Mon 5, O days Mon 5, Baseline Cos O SO O SO O CO CO CO CO CO C	I \$6,9 hrt Fir /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 ht Act. Cos 0 \$0.00 0 \$0.00 0 \$0.00 0 \$0.00 0 \$0.00	934.00 hish 5/6/05 5/6/05 bt Rem. Cost 0 \$1,694.00 0 \$3,680.00	_		
1.8.1.2.10 ID 3 4 5 ID 3 4 5 1.8.1.2.11	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technician Specialist Remove	Units 100% 400% 100% Units 100% 400% 100%	Remove Work 40 hrs 160 hrs 40 hrs Cost \$1,694.0 \$3,680.0 \$1,560.0 and South	Positive North Muon Wale Delay Star O days Mon 5, 0 \$0.0	I \$6,9 1	934.00 nish 5/6/05 5/6/05 st Rem. Cost 0 \$1,694.00 0 \$3,680.00 0 \$1,560.00	_		
1.8.1.2.10 ID 3 4 5 ID 3 4 5 ID 3 4 5 ID 1.8.1.2.11 ID	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technicial Specialist Remove Resource Name Mech. Engineer II Mech. Technical Specialist	Units 100% 400% 100% Units 100% 400% 100% /e North Units	Remove Work 40 hrs 160 hrs 40 hrs Cost \$1,694.0 \$3,680.0 \$1,560.0 and South Work 16 hrs	e North Muon Wal Delay Sta 0 days Mon 5, 0 days Mon 5, 0 days Mon 5, 0 days Mon 6, 0 solo 0 \$0.00 0 \$0.00 h CMP extensions Delay Star	I \$6,9 1	934.00 nish 5/6/05 5/6/05 5/6/05 st Rem. Cost 0 \$1,694.00 0 \$3,680.00 0 \$1,560.00 773.60 nish	_		
1.8.1.2.10 ID 3 4 5 ID 3 4 5 ID 3 1.8.1.2.11 ID 3	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technicial Specialist Remove Resource Name Mech. Engineer II	Units 100% 400% 100% Units 100% 400% 100% /e North Units 100%	Remove Work 40 hrs 160 hrs 40 hrs Cost \$1,694.0 \$3,680.0 \$1,560.0 and South Work 16 hrs 64 hrs	North Muon Wale Delay Sta 0 days Mon 5, 0 days Mon 5, 0 days Mon 5, 0 days Mon 5, 0 solution Baseline Cos 00 \$0.00 00 \$0	I \$6,9 Int Fir /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2 Act. Cos 0 \$0.00 0 \$0.00 0 \$0.00 0 \$0.00 c \$0.00	934.00 nish 5/6/05 5/6/05 5/6/05 st Rem. Cost 0 \$1,694.00 0 \$3,680.00 0 \$1,560.00 773.60 nish 5/10/05	_		
1.8.1.2.10 ID 3 4 5 ID 3 4 5 ID 3 4 5 ID 3 4 5	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technicial Specialist Remove Resource Name Mech. Engineer II Mech. Technical Specialist	Units 100% 400% 100% Units 100% 400% 100% /ce North Units 100% 400%	Remove Work 40 hrs 160 hrs 40 hrs Cost \$1,694.0 \$3,680.0 \$1,560.0 and South Work 16 hrs 64 hrs	Poorth Muon Wale Delay O days O days Mon 5, O days Mon 5, Baseline Cos O O O O O O O O O O O O O	I \$6,9 1	934.00 hish 5/6/05 5/6/05 5/6/05 st Rem. Cost 0 \$1,694.00 0 \$3,680.00 0 \$1,560.00 773.60 hish 5/10/05 5/10/05	_		
1.8.1.2.10 ID 3 4 5 ID 3 4 5 ID 3 4 5 ID 3 4 5	Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Remove Resource Name Mech. Engineer II Mech. Technical Specialist	Units 100% 400% 100% Units 100% 400% 100% /e North Units 100% 400% 100%	Remove Work 40 hrs 160 hrs 40 hrs Cost \$1,694.0 \$3,680.0 \$1,560.0 and South Work 16 hrs 64 hrs 16 hrs	e North Muon Wal Delay Sta 0 days Mon 5, 0 days Mon 5, 0 days Mon 5, 0 solution Baseline Cos 0 \$0.00 0 \$0.00 0 \$0.00 h CMP extensions Delay Start 0 days Mon 5,9 0 days Mon 5,9 0 days Mon 5,9 0 days Mon 5,9 8 Baseline Cos	I \$6,9 Int Fir /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Fri 5 /2/05 Tue 5	934.00 nish 5/6/05 5/6/05 5/6/05 st Rem. Cost 0 \$1,694.00 0 \$3,680.00 0 \$1,560.00 773.60 nish 5/10/05 5/10/05 st Rem. Cost	_		

WBS			Name				Cost		
	rth a	and South CMP extensions" c							
	ID	Resource Name	Units	Cost	Base	eline Cost	Act. Cost	Rem. Cost	
_	4	Mech. Technician II	400%	\$1,472.0	0	\$0.00	\$0.00	\$1,472.00	
	5	Mech. Technical Specialist	100%	\$624.0	0	\$0.00	\$0.00	\$624.00	
1.8.1.2.	12		Central	Detector	Ready to	Roll Out	\$	0.00	
1.8.1.2.	13	Mov	e Centra	al Detector	to Asse	mbly Hall	\$2,77	3.60	
	ID	Resource Name	Units	Work	Delay	Start	Fir	ish	
	3	Mech. Engineer II	100%	16 hrs	0 days	Wed 5/11	/05 Thu 5	/12/05	
	4	Mech. Technician II	400%	64 hrs	0 days	Wed 5/11			
	5	Mech. Technical Specialist	100%	16 hrs	0 days	Wed 5/11	/05 Thu 5	/12/05	
_	ID	Resource Name	Units	Cost		eline Cost	Act. Cost	Rem. Cost	
	3	Mech. Engineer II	100%	\$677.6		\$0.00	\$0.00	\$677.60	
	4	Mech. Technician II	400%	\$1,472.0		\$0.00	\$0.00	\$1,472.00	
	5	Mech. Technical Specialist	100%	\$624.0	0	\$0.00	\$0.00	\$624.00	
1.8	3.2			Ass	sembly H	łall Tasks	\$395,79	9.20	
1.8.2) 1			Misc	Cable In	nstallation	\$98,27		
1.8.2.1						ey Cables	\$7,33		
	ID	Resource Name	Units	Work	Delay	Start	Fini	sh	
	4	Mech. Technician II	400%	224 hrs	0 days	Fri 5/20/	05 Tue 5/3	31/05	
	5	Mech. Technical Specialist	100%	56 hrs	0 days	Fri 5/20/	05 Tue 5/	31/05	
_	ID	Resource Name	Units	Cost	Base	eline Cost	Act. Cost	Rem. Cost	
_	4	Mech. Technician II	400%	\$5,152.0	0	\$0.00	\$0.00	\$5,152.00	
	5	Mech. Technical Specialist	100%	\$2,184.0	0	\$0.00	\$0.00	\$2,184.00	
	Nlot								

Notes

Standard run 1 cable carrier crew -- 4 people and Dervin Installation to superlayer 7 only -- means 10 pulls

2 pulls/day for 1 crew

1 day each end to dress cables into cable carrier slots and install bracketry

WBS		Name		Cost		
1.8.2.1.2	Install SVX ca	bles fron	n racks to repeater		36.00	
ID	Resource Name	Units	Work Delay	•	nish	
4	Mech. Technician II	400%	256 hrs 0 days		/10/05	
5	Mech. Technical Specialist	50%	32 hrs 0 days	Wed 6/1/05 Fri 6/	/10/05	
ID	Resource Name	Units		eline Cost Act. Cost		
4	Mech. Technician II	400%	\$5,888.00	\$0.00 \$0.00		
5	Mech. Technical Specialist	50%	\$1,248.00	\$0.00 \$0.00	\$1,248.00	
Not	tes					
	echnicians 2 days/rack					
	ks to do lys for 2 people, 8 days for 4					
1.8.2.1.3	Install Silicon Cables f	rom Det	ector to Repeater (Card Ring \$5,24	40.00	
ID	Resource Name	Units	Work Delay	Start Fir	nish	
4	Mech. Technician II	400%	160 hrs 0 days	Wed 6/1/05 Tue 6	6/7/05	
5	Mech. Technical Specialist	100%	40 hrs 0 days	Wed 6/1/05 Tue 6	6/7/05	
ID	Resource Name	Units	Cost Base	eline Cost Act. Cost	Rem. Cost	
4	Mech. Technician II	400%	\$3,680.00	\$0.00 \$0.00		
5	Mech. Technical Specialist	100%	\$1,560.00	\$0.00 \$0.00	\$1,560.00	
Not	tes					
two pe	eople 5 days east, same for the west					
1.8.2.1.4		Timing C	ables upstairs to d	downstairs \$10,48	80.00	
<u>ID</u>	Resource Name	Units	Work Delay		nish	
4	Mech. Technician II	400%	320 hrs 0 days		6/21/05	
5	Mech. Technical Specialist	100%	80 hrs 0 days	Wed 6/8/05 Tue 6	6/21/05	
ID	Resource Name	Units		eline Cost Act. Cost		
4	Mech. Technician II	400%	\$7,360.00	\$0.00 \$0.00		
5	Mech. Technical Specialist	100%	\$3,120.00	\$0.00 \$0.00	\$3,120.00	
No	tes					

¹ bunch to each calorimeter rack

There are 12 racks (4 plug, 8 central, 0 endwall)

2 pulls/day, 2 days to prep cable carrier, 2 days to finalize cable carrier

WBS			١	Name				Cost			
"T''-				-							
"Timing Ca		upstairs to downstairs"	continue	a							
	Not										
	TO day	ys total									
1.8.2	2.1.5			Mair	ntain curr	ent infrastru	cture S	\$66,240.00			
	ID	Resource Name	Units	Work	Dela			inish			
	4	Mech. Technician II	200%	2,880 hi	s 0 da	ys Wed 4/	/13/05 Tue	1/3/06			
	ID	Resource Name	Units	Cost	Ва	seline Cost	Act. Cost	Rem. Cost			
	4	Mech. Technician II	200%	\$66,240	.00	\$0.00	\$0.00	\$66,240.00			
183	2.1.6			Bui	ndle cabl	es for instal	lation	\$1,840.00			
	ID	Resource Name	Units	Work	Delay	Start	Finish		Baseline Cost	Act. Cost	Rem. Cost
	4	Mech. Technician II	200%	80 hrs		Fri 5/13/05			\$0.00	\$0.00	\$1,840.00
	Not	·PS			•						
		s prep work for cable installation	on laving o	out cables.	adding labe	ls. bundlina aro	ups of cables to	gether that go to a si	nale corner. Rouahly	40 bundles. Or	ne crew of 2 can
	bundle	e 4 sets/day					•				
1.1	3.2.2		Upara	ade Silico	on Contro	ols and Inter	locks \$	115,822.00			
	Not	es	949.		• • · · · · ·		φ				
		mate to replace SVX &	ISL Sima	tic with A	PACS ar	nd Quad					
	Gen	eral philosophy									
		d all bulkhead temperat	ures with	Quadlog	and trip i	f too hot					
		d all bulkhead pressures									
		uate critical portions pe			<u> </u>						
		CS provides monitoring			e interloc	ks					
	Task	(ngine	ering tec	hnician					
	Rew	ire 471 devices		2	2	3					
	conf	igure 471 I/O		1							
	conf	igure logic		2	2						
	chec	ckout		1		2					
	FIX	data base		0.	5	2					
	FIX	oictures		0.	5	1					

1

0.5

Safety Life Cycle evaluation

external reviews

WBS				Name			С	ost			
"I Ingrade S	ilicor	Controls and Interloc	ks" conti	nued							
Opgrade 3	Not		KS COITE	ilueu							
-	1400	00									
;	Spread	dsheet from email message for	rom Rich S	chmitt dated	April 25, 20	001					
ı	My gu	ess is that this is too low an e	stimate bo	th in \$\$\$ an	d effort						
ı	ITs pro	bbably a couple of weeks just	to write the	e new wiring	list from HR	rack to quadlog					
1.8.2.		Engineer Quadle	a Calutia	n nlass	ordoro oo	of atura via va	oto ¢¢	276.00			
1.0.2.		Engineer Quadlo	•	•	•	•		8,776.00			
-	ID 1	Resource Name FNALOP	Units 0%	Work 0 hrs	Delay 0 days	Start Wed 4/13/0	Finis 5 Wed 4/1				
	3	Mech. Engineer II	100%	160 hrs	0 days	Wed 4/13/0 Wed 4/13/0					
	ID	Resource Name	Units	Cost	Bas	seline Cost	Act. Cost F	Rem. Cost			
-	1	FNALOP	0%	\$62,000		\$0.00		62,000.00			
	3	Mech. Engineer II	100%	\$6,776		\$0.00		\$6,776.00			
1.8.2.	2.2				Writ	te Quadlog Co	ode \$2	0,328.00			
_	ID	Resource Name	Units	Work	Delay	Start	Finish		Baseline Co	ost Act. C	Cost Rem. Cost
	3	Mech. Engineer II	100%	480 hrs	0 days	Wed 5/11/0	5 Thu 8/4/	05 \$20,328.0	00 \$0.	00 \$0	0.00 \$20,328.00
1.8.2.	2.3			Ins	tall Quadl	log infrastruct	ure \$	1,104.00			
									D " 0		
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cos	t Act. Co	st Rem. Cost
-	ID 4	Resource Name Mech. Technician II	Units 200%	Work 48 hrs	Delay 0 days	Start Wed 5/11/05					
1.8.2.	4		200%	48 hrs	0 days		5 Fri 5/13/0				
1.8.2.	4		200%	48 hrs	0 days	Wed 5/11/05	5 Fri 5/13/0	05 \$1,104.00 2,080.00) \$0.0	00 \$1,104.00
1.8.2.	4 2.4	Mech. Technician II	200% Rewire	48 hrs from Ho	0 days me Run F Delay	Wed 5/11/05 Rack to Quadl Start	5 Fri 5/13/0 og \$2: Finish	05 \$1,104.00 2,080.00 n Cost	\$0.00 Baseline C) \$0.0 ost Act. (00 \$1,104.00
1.8.2.	4 2.4 ID 4	Mech. Technician II Resource Name	200% Rewire Units	48 hrs from Ho Work	0 days me Run F Delay	Wed 5/11/05 Rack to Quadl Start	5 Fri 5/13/0 og \$2: Finish 05 Thu 8/4	05 \$1,104.00 2,080.00 n Cost	\$0.00 Baseline C) \$0.0 ost Act. (00 \$1,104.00 Cost Rem. Cost
-	4 2.4 ID 4	Mech. Technician II Resource Name	200% Rewire Units	48 hrs from Ho Work	0 days me Run F Delay	Wed 5/11/05 Rack to Quadl Start Wed 5/11/0	5 Fri 5/13/0 og \$2: Finish 05 Thu 8/4	05 \$1,104.00 2,080.00 n Cost /05 \$22,080.	\$0.00 Baseline C) \$0.0 ost Act. (Cost Rem. Cost 0.00 \$22,080.00
-	2.4 ID 4 2.5 ID 3	Mech. Technician II Resource Name Mech. Technician II Resource Name Mech. Engineer II	200% Rewire Units 200% Units 100%	48 hrs e from Ho Work 960 hrs Work 40 hrs	0 days me Run F Delay 0 days Delay Delay 0 days	Wed 5/11/05 Rack to Quadl Start Wed 5/11/0 Test and Dub Start Fri 8/5/05	og \$2: og \$2: Finish 05 Thu 8/4 oug \$: Finish Thu 8/11/05	05 \$1,104.00 2,080.00 n Cost /05 \$22,080. 3,534.00 Cost \$1,694.00	Baseline C 00 \$0 Baseline Cost \$0.00	ost Act. (.00 \$ Act. Cost \$0.00	Cost Rem. Cost 0.00 \$22,080.00 Rem. Cost \$1,694.00
-	4 2.4 ID 4 2.5 ID	Mech. Technician II Resource Name Mech. Technician II Resource Name	200% Rewire Units 200% Units	48 hrs e from Ho Work 960 hrs	0 days me Run F Delay 0 days Delay	Wed 5/11/05 Rack to Quadl Start Wed 5/11/0 Test and Dub Start Fri 8/5/05	5 Fri 5/13/0 og \$2: Finish 05 Thu 8/4 oug \$: Finish	05 \$1,104.00 2,080.00 n Cost /05 \$22,080. 3,534.00 Cost \$1,694.00	\$0.00 Baseline C 00 \$0 Baseline Cost	ost Act. (0.00 \$ Act. Cost	Cost Rem. Cost 0.00 \$22,080.00 Rem. Cost \$1,694.00
-	4 2.4 ID 4 2.5 ID 3 4	Mech. Technician II Resource Name Mech. Technician II Resource Name Mech. Engineer II	200% Rewire Units 200% Units 100%	48 hrs e from Ho Work 960 hrs Work 40 hrs	0 days me Run F Delay 0 days Delay Delay 0 days 0 days 0 days	Wed 5/11/05 Rack to Quadl Start Wed 5/11/0 Test and Dub Start Fri 8/5/05	og \$2: og \$2: Finish 05 Thu 8/4 oug \$: Finish Thu 8/11/05 Thu 8/11/05	05 \$1,104.00 2,080.00 n Cost /05 \$22,080. 3,534.00 Cost \$1,694.00	Baseline C 00 \$0 Baseline Cost \$0.00	ost Act. (.00 \$ Act. Cost \$0.00	Cost Rem. Cost 0.00 \$22,080.00 Rem. Cost \$1,694.00
1.8.2.	4 2.4 ID 4 2.5 ID 3 4	Mech. Technician II Resource Name Mech. Technician II Resource Name Mech. Engineer II	200% Rewire Units 200% Units 100%	48 hrs from Ho Work 960 hrs Work 40 hrs 80 hrs	0 days me Run F Delay 0 days Delay 0 days 0 days 0 days Place	Wed 5/11/05 Rack to Quadl Start Wed 5/11/0 Test and Dub Start Fri 8/5/05 Fri 8/5/05	og \$2: og \$2: Finish 05 Thu 8/4 oug \$: Finish Thu 8/11/05 Thu 8/11/05	05 \$1,104.00 2,080.00 n Cost /05 \$22,080. 3,534.00 Cost \$1,694.00 \$1,840.00	Baseline C 00 \$0 Baseline Cost \$0.00 \$0.00	ost Act. (.00 \$ Act. Cost \$0.00 \$0.00	Cost Rem. Cost 0.00 \$22,080.00 Rem. Cost \$1,694.00

WBS				Name			Cost				
	.2.3			· · · · · · · · · · · · · · · · · · ·		Cryo Platforr		4 40			
					D:						
1.8.2		D 11		10/	_	ew Cryo platforr			D ! O !		D 0 1
	<u>ID</u>	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	2 3	Designer Mech. Engineer II	100% 50%	160 hrs 80 hrs	,		Tue 5/10/05 Tue 5/10/05	\$6,102.40 \$3,388.00	\$0.00 \$0.00	\$0.00 \$0.00	\$6,102.40 \$3,388.00
		Mech. Engineerii	30 76	00 1113	U uays	Wed 4/13/03	1 de 3/10/03	ψ5,366.00	ΨΟ.ΟΟ	ψυ.υυ	ψ3,300.00
1.8.2	.3.2			Imp	rove Cryo	Platform acces	s \$6,93	4.00			
	ID	Resource Name		Units	Work	Delay Sta					
	3	Mech. Engineer II		100%		0 days Thu 6					
	4	Mech. Technician I				0 days Thu 6					
	5	Mech. Technical Sp	pecialist	100%		0 days Thu 6					
	ID	Resource Name		Units	Cost	Baseline Cos		Rem. Cost	_		
	3	Mech. Engineer II			\$1,694.00			\$1,694.00			
	4	Mech. Technician I			\$3,680.00		•	\$3,680.00			
	5	Mech. Technical Sp	pecialist	100%	\$1,560.00	\$0.0	0 \$0.00	\$1,560.00			
1.8	.2.4			Improv	e Access	to Silicon Rack	s \$18,35	3.60			
1.8.2						licon rack acces					
1.0.2	.4. 1			Deal	gii new sii	iicuii iack acces	5 09.10	3.00			
	ID	Danas Massa	1.1		Dalaii				0!: O+ A		0
	ID			Work	Delay	Start	Finish	Cost E			em. Cost
	1D 2			Work		Start	Finish		Baseline Cost A \$0.00		em. Cost_ 59,153.60
1.8.2	2			Work 240 hrs (0 days V	Start	Finish ue 5/24/05	Cost E \$9,153.60			
1.8.2	2	Designer Resource Name	100% 2 Units	Work 240 hrs (Work	0 days V Construct Delay	Start Wed 4/13/05 T access platform Start	Finish Tue 5/24/05 s \$7,36 Finish	Cost E \$9,153.60 0.00 Cost	\$0.00 Baseline Cost	\$0.00	
1.8.2	2 .4.2	Designer	100% 2 Units	Work 240 hrs (Work	0 days V Construct Delay	Start Wed 4/13/05 Taccess platform Start	Finish Tue 5/24/05 s \$7,36 Finish	Cost E \$9,153.60 0.00 Cost	\$0.00 Baseline Cost	\$0.00 S	\$9,153.60
1.8.2	2 .4.2 ID	Designer Resource Name Mech. Technician I	100% 2 Units	Work 240 hrs (Work	0 days V Construct Delay	Start Wed 4/13/05 T access platform Start	Finish Tue 5/24/05 s \$7,36 Finish	Cost E \$9,153.60 0.00 Cost	\$0.00 Baseline Cost	\$0.00 S	Rem. Cost
	2 .4.2 ID 4 Note	Designer Resource Name Mech. Technician I	100% 2 Units I 200%	Work 240 hrs (Work	0 days V Construct Delay	Start Wed 4/13/05 T access platform Start	Finish Tue 5/24/05 s \$7,36 Finish	Cost E \$9,153.60 0.00 Cost	\$0.00 Baseline Cost	\$0.00 S	Rem. Cost
	2 .4.2 ID 4 Note	Designer Resource Name Mech. Technician I	100% 2 Units I 200%	Work 240 hrs (Work	0 days V Construct Delay	Start Wed 4/13/05 T access platform Start	Finish Tue 5/24/05 \$ s \$7,36 Finish Tue 5/10/05	Cost E \$9,153.60 0.00 Cost 5 \$7,360.00	\$0.00 Baseline Cost	\$0.00 S	Rem. Cost
	2 .4.2 ID 4 Note	Designer Resource Name Mech. Technician I	100% 2 Units I 200%	Work 240 hrs (Work	0 days V Construct Delay	Start Wed 4/13/05 T access platform Start Wed 4/13/05	Finish Tue 5/24/05 \$ s \$7,36 Finish Tue 5/10/05	Cost E \$9,153.60 0.00 Cost 5 \$7,360.00	\$0.00 Baseline Cost	\$0.00 S	Rem. Cost
	2 .4.2 ID 4 Note 1 week	Designer Resource Name Mech. Technician I es k to build each one, 4 platfo	Units I 200% orms Units	Work 240 hrs (Work 320 hrs	O days N Construct Delay S O days	Start Wed 4/13/05 T access platform Start Wed 4/13/05 Install platform	Finish Tue 5/24/05 S S S Finish Tue 5/10/05 S S \$1,84	Cost E \$9,153.60 0.00 Cost 5 \$7,360.00	\$0.00 Baseline Cost \$0.00	\$0.00 \$ Act. Cost \$0.00	Rem. Cost \$7,360.00
1.8.2	2 .4.2 ID 4 Note 1 week .4.3 ID 4	Designer Resource Name Mech. Technician I es to build each one, 4 platfo	Units I 200% urms Units	Work 240 hrs (Work 320 hrs	O days N Construct Delay S O days	Start Wed 4/13/05 T access platform Start Wed 4/13/05 Install platform Start Wed 5/11/05	Finish Tue 5/24/05 s \$7,36 Finish Tue 5/10/05 s \$1,84 Finish Tue 5/17/05	Cost E \$9,153.60 0.00 Cost \$7,360.00 0.00 Cost \$1,840.00	\$0.00 Baseline Cost \$0.00 Baseline Cost	\$0.00 S Act. Cost \$0.00	Rem. Cost \$7,360.00
1.8.2 1.8	2 .4.2 ID 4 Note 1 week .4.3 ID 4	Designer Resource Name Mech. Technician I es to build each one, 4 platfo	Units I 200% urms Units	Work 240 hrs (Work 320 hrs	O days N Construct Delay S O days	Start Wed 4/13/05 T access platform Start Wed 4/13/05 Install platform Start	Finish Tue 5/24/05 s \$7,36 Finish Tue 5/10/05 s \$1,84 Finish Tue 5/17/05	Cost E \$9,153.60 0.00 Cost \$7,360.00 0.00 Cost \$1,840.00	\$0.00 Baseline Cost \$0.00 Baseline Cost	\$0.00 S Act. Cost \$0.00	Rem. Cost \$7,360.00
1.8.2	2 .4.2 ID 4 Note 1 week .4.3 ID 4 .2.5	Resource Name Mech. Technician I es to build each one, 4 platfor Resource Name Mech. Technician I	Units I 200% Units Units Units I 200%	Work 240 hrs (Work 320 hrs Work 80 hrs	Delay Delay Delay Delay Delay Odays	Start Ned 4/13/05 T access platform Start Wed 4/13/05 Install platform Start Wed 5/11/05 Flammable Ga Engineerin	Finish Tue 5/24/05 s \$7,36 Finish Tue 5/10/05 s \$1,84 Finish Tue 5/17/05 s \$36,04 g \$20,32	Cost E \$9,153.60 0.00	\$0.00 Baseline Cost \$0.00 Baseline Cost \$0.00	\$0.00 \$ Act. Cost \$0.00 Act. Cost \$0.00	Rem. Cost \$7,360.00 Rem. Cost \$1,840.00
1.8.2 1.8	2 .4.2 ID 4 Note 1 week .4.3 ID 4 .2.5 .5.1	Resource Name Mech. Technician I es to build each one, 4 platfor Resource Name Mech. Technician I	Units I 200% Units Units Units Units Units	Work 240 hrs Work 320 hrs Work 80 hrs	Delay Delay Delay Delay Delay Delay Delay	Start Ned 4/13/05 T access platform Start Wed 4/13/05 Install platform Start Wed 5/11/05 Flammable Ga Engineerin Start	Finish Tue 5/24/05 s \$7,36 Finish Tue 5/10/05 s \$1,84 Finish Tue 5/17/05 s \$36,04 g \$20,32 Finish	Cost E \$9,153.60 0.00 Cost 5 \$7,360.00 Cost \$1,840.00 8.00 Cost Cost	\$0.00 Baseline Cost \$0.00 Baseline Cost \$0.00 Baseline Cost	\$0.00 \$ Act. Cost \$0.00 Act. Cost \$0.00 Act. Cost	Rem. Cost \$7,360.00 Rem. Cost \$1,840.00
1.8.2 1.8	2 .4.2 ID 4 Note 1 week .4.3 ID 4 .2.5	Resource Name Mech. Technician I es to build each one, 4 platfor Resource Name Mech. Technician I	Units I 200% Units Units Units I 200%	Work 240 hrs (Work 320 hrs Work 80 hrs	Delay Delay Delay Delay Delay Delay Delay	Start Ned 4/13/05 T access platform Start Wed 4/13/05 Install platform Start Wed 5/11/05 Flammable Ga Engineerin Start	Finish Tue 5/24/05 s \$7,36 Finish Tue 5/10/05 s \$1,84 Finish Tue 5/17/05 s \$36,04 g \$20,32	Cost E \$9,153.60 0.00	\$0.00 Baseline Cost \$0.00 Baseline Cost \$0.00	\$0.00 \$ Act. Cost \$0.00 Act. Cost \$0.00	Rem. Cost \$7,360.00 Rem. Cost \$1,840.00

WBS		Name		Cos	t			
1.8.2.5.2	Complete		lving instrumenta		20.00			
ID Reso	urce Name	Units Wor	k Delay	Start	Finish			
4 Mech	n. Technician II	200% 480 h	rs 0 days We	ed 5/11/05 We	ed 6/22/05			
5 Mech	n. Technical Specialist	50% 120 h	rs 0 days We	ed 5/11/05 We	ed 6/22/05			
ID Reso	urce Name	Units C	ost Baseline	Cost Act. Cos				
4 Mech	n. Technician II	200% \$11,0	40.00	\$0.00 \$0.0	0 \$11,040.	00		
5 Mech	n. Technical Specialist	50% \$4,6	80.00	\$0.00 \$0.0	90 \$4,680.	00		
1.8.2.6			SVXII Rem	oval \$18,4	84.00			
1.8.2.6.1			Open Both Endp	luas \$1.3	86.80			
	urce Name	Units Work		•	inish			
	n. Engineer II	100% 8 hr			1 5/11/05			
	n. Technician II	400% 32 hr	•		5/11/05			
5 Mech	n. Technical Specialist	100% 8 hr	•	5/11/05 Wed	1 5/11/05			
ID Reso	urce Name	Units Cos	t Baseline Co	st Act. Cost	Rem. Cost			
3 Mech	n. Engineer II	100% \$338			\$338.80	-		
	n. Technician II	400% \$736			\$736.00			
5 Mech	n. Technical Specialist	100% \$312	00 \$0.	00 \$0.00	\$312.00			
1.8.2.6.2		Inst	all South Transpo	orter \$1,3	86.80			
ID Reso	urce Name	Units Work	Delay	Start Fir	nish			
	n. Engineer II	100% 8 hr			5/12/05			
	n. Technician II	400% 32 hr			5/12/05			
5 Mech	n. Technical Specialist	100% 8 hr	s 0 days Thu	5/12/05 Thu 5	5/12/05			
	urce Name	Units Cos			Rem. Cost			
	n. Engineer II	100% \$338			\$338.80			
	n. Technician II	400% \$736	·	•	\$736.00			
5 Mech	n. Technical Specialist	100% \$312	00 \$0.	00 \$0.00	\$312.00			
1.8.2.6.3) J	ıncable west end	plug \$1,4	72.00			
ID Reso	urce Name Units	Work De		Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
4 Mech	n. Technician II 400%	64 hrs 0 da	ays Fri 5/13/05	Mon 5/16/05	\$1,472.00	\$0.00	\$0.00	\$1,472.00

WBS		Name			Cost
1.8.2.6.4	Install Bl		e and Rotate	West Endolua	\$2,773.60
ID	Resource Name	Units	Work Del	. •	Finish
3	Mech. Engineer II	100%	16 hrs 0 da	,	Wed 5/18/05
4	Mech. Technician II	400%	64 hrs 0 da	,	Wed 5/18/05
5	Mech. Technical Specialist	100%	16 hrs 0 da	,	Wed 5/18/05
ID	Resource Name	Units	Cost	Baseline Cost A	.ct. Cost Rem. Cost
3	Mech. Engineer II	100%	\$677.60	\$0.00	\$0.00 \$677.60
4	Mech. Technician II	400%	\$1,472.00	\$0.00	\$0.00 \$1,472.00
5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00 \$624.00
1.8.2.6.5			Uncable Silic	on inside bore	\$2,773.60
ID	Resource Name	Units	Work Del	ay Start	Finish
3	Mech. Engineer II	100%	16 hrs 0 da	•	Fri 5/20/05
4	Mech. Technician II	400%	64 hrs 0 da	,	Fri 5/20/05
5	Mech. Technical Specialist	100%	16 hrs 0 da	•	Fri 5/20/05
ID	Resource Name	Units	Cost	Baseline Cost A	.ct. Cost Rem. Cost
3	Mech. Engineer II	100%	\$677.60	\$0.00	\$0.00 \$677.60
4	Mech. Technician II	400%	\$1,472.00	\$0.00	\$0.00 \$1,472.00
5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00 \$624.00
1.8.2.6.6			Insta	II Rail System	\$1,386.80
ID	Resource Name	Units	Work Del	ay Start	Finish
3	Mech. Engineer II	100%	8 hrs 0 da	ays Mon 5/23/05	Mon 5/23/05
4	Mech. Technician II	400%	32 hrs 0 da	•	
5	Mech. Technical Specialist	100%	8 hrs 0 da		Mon 5/23/05
_ID	Resource Name	Units	Cost Ba	aseline Cost Act	. Cost Rem. Cost
3	Mech. Engineer II	100%	\$338.80	\$0.00	\$0.00 \$338.80
4	Mech. Technician II	400%	\$736.00	\$0.00	\$0.00 \$736.00
5	Mech. Technical Specialist	100%	\$312.00	\$0.00	\$0.00 \$312.00
1.8.2.6.7	Rei	nove Sil	icon Cables fr	om 30 degree	\$3,144.00
ID	Resource Name	Units	Work Del	ay Start	Finish
4	Mech. Technician II	200%	96 hrs 0 da	ays Wed 5/11/05	5 Wed 5/18/05
5	Mech. Technical Specialist	50%	24 hrs 0 da	•	

WBS			Name				Cost	:	
"Remove S	Silicon	Cables from 30 degree" cont	tinued						
	ID	Resource Name	Units	Cost	Base	eline Cost	Act. Cost	Rem. Cost	
	4	Mech. Technician II	200%	\$2,208.00	0	\$0.00	\$0.00	\$2,208.00	_
	5	Mech. Technical Specialist	50%	\$936.00	0	\$0.00	\$0.00	\$936.00	
	Not	es							
	2 guys	, 3 days per bore							
1.8.2	2.6.8				Remo	ve SVX II	\$2,7	73.60	
	ID	Resource Name	Units	Work	Delay	Start	Fi	nish	
	3	Mech. Engineer II	100%	16 hrs	0 days	Tue 5/24/0	5 Wed	5/25/05	
	4	Mech. Technician II	400%	64 hrs	0 days	Tue 5/24/0	5 Wed	5/25/05	
	5	Mech. Technical Specialist	100%	16 hrs (0 days	Tue 5/24/0	5 Wed	5/25/05	
	ID	Resource Name	Units	Cost	Base	eline Cost	Act. Cost	Rem. Cost	
	3	Mech. Engineer II	100%	\$677.60		\$0.00	\$0.00	\$677.60	
	4	Mech. Technician II	400%	\$1,472.00		\$0.00	\$0.00	•	
	5	Mech. Technical Specialist	100%	\$624.00	0	\$0.00	\$0.00	\$624.00	
1.8.2	2.6.9		Ready	to be Trans	sported t	to Sci Det	\$1,3	86.80	
	ID	Resource Name	Units	Work	Delay	Start	Fir	nish	
	3	Mech. Engineer II	100%		0 days	Thu 5/26/0		/26/05	
	4	Mech. Technician II	400%		0 days	Thu 5/26/0		/26/05	
	5	Mech. Technical Specialist	100%	8 hrs	0 days	Thu 5/26/0	5 Thu 5	/26/05	
	ID	Resource Name	Units	Cost	Baseli	ne Cost A	ct. Cost	Rem. Cost	
	3	Mech. Engineer II	100%	\$338.80		\$0.00	\$0.00	\$338.80	
	4	Mech. Technician II	400%	\$736.00		\$0.00	\$0.00	\$736.00	
	5	Mech. Technical Specialist	100%	\$312.00		\$0.00	\$0.00	\$312.00	
1.8.2.	6 1N		Silicon [Detector Re	auired :	at Sci Det		\$0.00	
			00011 2						
	3.2.7					nstallation	\$40,1		
1.8.2	2.7.1		h while p	oreserving	COT rad			47.20	
	ID	Resource Name	Units	Work	Delay	Start		inish	
	3	Mech. Engineer II	100%	32 hrs	0 days			6/1/05	
	4	Mech. Technician II	400%	128 hrs	0 days			1 6/1/05	
	5	Mech. Technical Specialist	100%	32 hrs	0 days	Thu 5/26/	05 Wed	l 6/1/05	

WBS		Name		Cost				
"Pull Arch whil	e preserving COT rack access	s" continued						
ID	•	Units Cost	Baseline Cost	Act. Cost	Rem. Cost			
3	Mech. Engineer II	100% \$1,355.20		\$0.00	\$1,355.20	-		
4	Mech. Technician II	400% \$2,944.00		\$0.00	\$2,944.00			
5	Mech. Technical Specialis	100% \$1,248.00	\$0.00	\$0.00	\$1,248.00			
1.8.2.7.2	Remov	e old preradiator and	l crack chambers	\$7,360				
<u> </u>			Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
4	Mech. Technician II 4009	% 320 hrs 0 days	Thu 6/2/05 W	/ed 6/15/05	\$7,360.00	\$0.00	\$0.00	\$7,360.00
N	otes							
2 gu	ys can do 1 arch in 1 week							
1.8.2.7.3	Remove ob	solete infrastructure	(cables, gas, etc)	\$3,680	0.00			
<u> IC</u>			Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
4	Mech. Technician II 4009	% 160 hrs 0 days	Thu 6/16/05	Wed 6/22/05	\$3,680.00	\$0.00	\$0.00	\$3,680.00
N	otes							
2 gu	ys can do 1 arch in 1/2 week							
1.8.2.7.4	. Instal	I new preradiator and	I crack chambers	\$10,480	0.00			
IC	Resource Name	Units Work	Delay Star	t Fin	nish			
4	Mech. Technician II	400% 320 hrs	0 days Thu 6/2	3/05 Thu	7/7/05			
5	Mech. Technical Specialist		0 days Thu 6/2	3/05 Thu 7	/21/05			
ID	Resource Name	Units Cost	Baseline Cost	Act. Cost	Rem. Cost			
4	Mech. Technician II	400% \$7,360.00		\$0.00	\$7,360.00	-		
5	Mech. Technical Specialist	50% \$3,120.00	\$0.00	\$0.00	\$3,120.00			
_N	otes							
2 gu	ys can install new detectors 1 arch in 2	weeks						
1.8.2.7.5		Install new cab	les/infrastructure	\$8,920	0.00			
- 11	Resource Name	Units Work	Delay Start	Finis	sn .			
<u>IC</u> 4	Resource Name Mech. Technician II	Units Work 400% 320 hrs	Delay Start 0 days Fri 7/22					

WBS		Name			Cost				
"Install new cab	les/infrastructure" continued								
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost			
4	Mech. Technician II	400%	\$7,360.00	\$0.00	\$0.00	\$7,360.00	•		
5	Mech. Technical Specialist	50%	\$1,560.00	\$0.00	\$0.00	\$1,560.00			
No	tes								
New	cables, 2 guys 1 week per arch								
1.8.2.7.6				Close Arches	\$2,77	3.60			
ID	Resource Name	Units	Work	Delay Start	Finish				
3	Mech. Engineer II	100%	16 hrs (0 days Fri 8/5/05	Mon 8/8/	05			
4	Mech. Technician II	400%		0 days Fri 8/5/05					
5	Mech. Technical Specialist	100%	16 hrs (0 days Fri 8/5/05	Mon 8/8/	05			
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost			
3	Mech. Engineer II	100%	\$677.60	0.00\$	\$0.00	\$677.60	•		
4	Mech. Technician II	400%	\$1,472.00		\$0.00	\$1,472.00			
5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00	\$624.00			
1.8.2.7.7	Remo	e South	Transporte	r/concrete blocks	\$1,38	6.80			
<u>ID</u>	Resource Name	Units		Delay Start	Finish		Baseline Cost		
3	Mech. Engineer II	100%		0 days Tue 8/9/0		•	· ·	•	•
4	Mech. Technician II	400%		0 days Tue 8/9/0		•	•	•	•
5	Mech. Technical Specialist	100%	8 hrs (0 days Tue 8/9/0)5 Tue 8/9/	/05 \$312.00	\$0.00	\$0.00	\$312.00
1.8.2.8			Ca	alorimeter Timing	\$41,06	8.00			
1.8.2.8.1			•	bases from arch	\$2,94				
<u>ID</u>	Resource Name Units				Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
4	Mech. Technician II 2009	6 128 h	rs 0 days	Wed 5/11/05	Fri 5/20/05	\$2,944.00	\$0.00	\$0.00	\$2,944.00
_No	tes								
20 ba	ses/wedge								
48 we	edges								

10 per hour per man

1000 tubes 10 tubes/hour= 100 hours 3/4 efficiency per day 8 hours/day = 17 man days

WBS Name Cost

1.8.2.8.2 Recondition Bases \$0.00

Notes

Estimate taken directly out of Table 3

30 minutes/tube to modify connector and test

One person can do 15 tubes/day

2 people can do the job in 33 days as long as we keep them supplied in tubes

NOTE, NEED TO HAVE AT LEAST 3 PEOPLE DOING THIS -- OTHERWISE INSTALLATION GUYS SLOW DOWN AFTER 28 DAYS INTO THE PROJECT

1.8.2.8.3 Install reconditioned bases \$13,248.00

ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
4	Mech. Technician II	300%	576 hrs	0 days	Mon 5/23/05	Fri 6/24/05	\$13,248.00	\$0.00	\$0.00	\$13,248.00

Notes

Clean tube and transition piece, install pieces, tape to prevent light leaks

0.25 hours/tube * 1000 tubes = 250 hours

3/4 efficiency * 8 hours/day * 250 hours = 42 man days

in people, I have 2 guys working flat out installing, and 1 guy feeding the other two equipment...

1.8.2.8.4 Install wiring harness+test \$22,300.00

ID	Resource Name	Units	Work	Delay	Start	Finish
4	Mech. Technician II	400%	800 hrs	0 days	Mon 6/27/05	Mon 8/1/05
5	Mech. Technical Specialist	50%	100 hrs	0 days	Mon 6/27/05	Mon 8/1/05

ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost
4	Mech. Technician II	400%	\$18,400.00	\$0.00	\$0.00	\$18,400.00
5	Mech. Technical Specialist	50%	\$3,900.00	\$0.00	\$0.00	\$3,900.00

Notes

plug and central need wiring harnesses

For Central

12 harness's/arch * 4 arches = 48 harness's need to be installed

Each harness has 20 connectors

WBS			Na	ıme					Cos	st			
"Install wiri	ng ha	rness+test" continued											
	Not												
	Dre	ss cables at both ends											
	2 h	ours/harness or 24 days for one	crew										
	For PI	ug											
	12 l	narness/plug, 24 that need to be	installed										
	2 h	ours/harness or 12 days for one of	crew										
	Assun	ne Assume 25% problems = 5 ac	ditional da	ys in testin	ng								
1.8.2	.8.5	Install ASD	+ Trans	ition boa	ards, dre	ess cabl	les in rac	:k	\$2,5	576.00			
	ID	Resource Name	Jnits	Work	Delay	S	tart	Fin	ish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	4	Mech. Technician II 2	00% 1	12 hrs	0 days	Tue	8/2/05	Wed 8	3/10/0	5 \$2,576.00	\$0.00	\$0.00	\$2,576.00
	Not												
	plug a	nd central racks											
	1/2 da	y per rack 12 racks											
	1 day	to plug in cards											
1 Ω	.2.9				2	\/Y III I	nstallatio	n	C 11 '	179.60			
1.8.2				Cilio			nstallatio		Ψιι,	\$0.00			
1.8.2			I rans	sport Sili			et to CD			\$0.00			
1.8.2							into Bor			386.80			
	<u>ID</u>	Resource Name				Delay	Sta			Finish			
	3 4	Mech. Engineer II Mech. Technician II) days) days	Wed 7. Wed 7.			d 7/13/05 d 7/13/05			
	5	Mech. Technical Specia				days days	Wed 7			d 7/13/05 d 7/13/05			
	ID	Resource Name	U	nits	Cost	Baseli	ine Cost	Act.	Cost	Rem. Cost			
	3	Mech. Engineer II			338.80		\$0.00		0.00	\$338.80			
	4	Mech. Technician II			736.00		\$0.00		0.00	\$736.00			
	5	Mech. Technical Specia	alist 10	00% \$	312.00		\$0.00	\$	0.00	\$312.00			

WBS				Name					Cost				
1.8.2.	α 4				Inchworr	n tests a	nd survey			0.00			
1.8.2.			Dres				lose plugs			6.00			
1.0.2.	J.J ID	Resource Name	Units	Work	Delay	•	art	Fini	•	Cost	Baseline Cost	Act. Cost	Rem. Cost
-	4	Mech. Technician II	200%	32 hrs				Ved 7/		\$736.00	\$0.00	\$0.00	\$736.00
1.8.2.	9.6						olug in AH		\$2,77				
	ID	Resource Name		Units	Work	Delay	Start		Finis	sh			
-	3	Mech. Engineer II		100%	16 hrs	0 days	Thu 7/21	/05	Fri 7/22	2/05			
	4	Mech. Technician II		400%	64 hrs	0 days	Thu 7/21	/05	Fri 7/22	2/05			
	5	Mech. Technical Spec	cialist	100%	16 hrs	0 days	Thu 7/21	/05	Fri 7/22	2/05			
_	ID	Resource Name		Units	Cost		eline Cost		Cost	Rem. Cos			
	3	Mech. Engineer II		100%	\$677.6		\$0.00		\$0.00	\$677.6			
	4	Mech. Technician II		400%	\$1,472.0		\$0.00		\$0.00	\$1,472.0			
	5	Mech. Technical Spec	cialist	100%	\$624.0	00	\$0.00	;	\$0.00	\$624.0	0		
1.8.2.	1.8.2.9.7 West Endplug Cabling \$736.00												
	ID	Resource Name	Units	Work	Delay	S	tart	Fini	sh	Cost	Baseline Cost	Act. Cost	Rem. Cost
-	4	Mech. Technician II	200%	32 hrs	0 days	Mon 7	7/25/05	Tue 7/2	26/05	\$736.00	\$0.00	\$0.00	\$736.00
_	Note												
•	1 pers	on 2 days for each rack 2 rack	s per plug										
1.8.2.	9.8				Moun	t endplu	gs on rails		\$1,38	6.80			
_	ID	Resource Name		Units	Work	Delay	Start		Fin				
	3	Mech. Engineer II		100%	8 hrs	0 days	Mon 7/2		Mon 7				
	4	Mech. Technician II		400%	32 hrs	0 days	Mon 7/2		Mon 7				
	5	Mech. Technical Spec	cialist	100%	8 hrs	0 days	Mon 7/2	5/05	Mon 7	/25/05			
	ID	Resource Name		Units	Cost	Basel	ine Cost	Act. C	Cost F	Rem. Cost			
_	3	Mech. Engineer II		100%	\$338.80		\$0.00		0.00	\$338.80	_		
	4	Mech. Technician II		400%	\$736.00		\$0.00		0.00	\$736.00			
	5	Mech. Technical Spec	cialist	100%	\$312.00		\$0.00	\$C	0.00	\$312.00			
1.8.2.	9.9			CI	ose Plug	s in Asse	embly Hall		\$2,77				
	ID	Resource Name		Units	Work	Delay	Start		Fini	ish			
-	3	Mech. Engineer II		100%	16 hrs	0 days	Tue 7/26	3/05	Wed 7/	/27/05			
		Mech. Technician II		400%	64 hrs	0 days	Tue 7/26		Wed 7				

WBS			Name				Cost	t	
"Close Plug	s in <i>i</i>	Assembly Hall" continued							
	ID	Resource Name	Units	Work	Delay	Start	Fi	nish	
-	5	Mech. Technical Specialist	100%	16 hrs	0 days	Tue 7/26/05	Wed	7/27/05	
_	ID	Resource Name	Units	Cost			Act. Cost		
	3	Mech. Engineer II	100%	\$677.		\$0.00	\$0.00		
	4	Mech. Technician II	400%	\$1,472.		\$0.00	\$0.00		
	5	Mech. Technical Specialist	100%	\$624.	00	\$0.00	\$0.00	\$624.	00
1.8.2.9	.10		Rem	nove end _l	olug exte	nsion rails	\$1,3	86.80	
	ID	Resource Name	Units	Work	Delay	Start	Fir	nish	
_	3	Mech. Engineer II	100%	8 hrs	0 days	Thu 7/28/05	Thu 7	7/28/05	
	4	Mech. Technician II	400%	32 hrs	0 days	Thu 7/28/05	Thu 7	7/28/05	
	5	Mech. Technical Specialist	100%	8 hrs	0 days	Thu 7/28/05	Thu 7	7/28/05	
_	ID	Resource Name	Units	Cost	Basel	ine Cost Ac	t. Cost	Rem. Cos	<u>t</u>
	3	Mech. Engineer II	100%	\$338.80)	\$0.00	\$0.00	\$338.80	
	4	Mech. Technician II	400%	\$736.00)	\$0.00	\$0.00	\$736.00	
	5	Mech. Technical Specialist	100%	\$312.00)	\$0.00	\$0.00	\$312.00	
1.8.2.9	.11		Centra	al Detecto	or Ready	for Roll In		\$0.00	
	8.3					IIB Roll in	\$64,6		
				O1 F					
1.8.	ა. I			Centrai L	etector II	nstallation	\$31,2	03.00	
1.8.3.	1.1				Pul	I Detector	\$6	93.40	
_	ID	Resource Name	Units	Work	Delay	Start		inish	
	3	Mech. Engineer II	100%	4 hrs	0 days	Wed 8/10/0		8/10/05	
	4	Mech. Technician II	400%	16 hrs	0 days	Wed 8/10/0		8/10/05	
	5	Mech. Technical Specialist	100%	4 hrs	0 days	Wed 8/10/0	5 Wed	8/10/05	
_	ID	Resource Name	Units	Cost	Basel	ine Cost Ac	t. Cost	Rem. Cos	<u>t</u>
	3	Mech. Engineer II	100%	\$169.40		\$0.00	\$0.00	\$169.40	
	4	Mech. Technician II	400%	\$368.00)	\$0.00	\$0.00	\$368.00	
	5	Mech. Technical Specialist	100%	\$156.00)	\$0.00	\$0.00	\$156.00	
-	Not								
I	onger	detector roll in reflects installing South	CMP Win	g					

WBS		Name			Cost	
1.8.3.1.2			Install south CN	MP "wing"	\$1,386.80	
ID	Resource Name	Units	Work Delay	Start	Finish	
3	Mech. Engineer II	100%	8 hrs 0 days	Wed 8/10/05	Thu 8/11/05	
4	Mech. Technician II	400%	32 hrs 0 days	Wed 8/10/05	Thu 8/11/05	
5	Mech. Technical Specialist	100%	8 hrs 0 days	Wed 8/10/05	Thu 8/11/05	
ID	Resource Name	Units			Cost Rem. Cost	
3	Mech. Engineer II		\$338.80		\$0.00 \$338.80	
4	Mech. Technician II		\$736.00		\$0.00 \$736.00	
5	Mech. Technical Specialist	100%	\$312.00	\$0.00	\$0.00 \$312.00	
1.8.3.1.3	Pι	ısh detect	tor into position a	nd survey	\$2,773.60	
ID	Resource Name	Units	Work Delay	Start	Finish	
3	Mech. Engineer II	100%	16 hrs 0 days	Thu 8/11/05	Mon 8/15/05	
4	Mech. Technician II		64 hrs 0 days	Thu 8/11/05	Mon 8/15/05	
5	Mech. Technical Specialist	100%	16 hrs 0 days	Thu 8/11/05	Mon 8/15/05	
ID	Resource Name	Units			ct. Cost Rem. Cost	
3	Mech. Engineer II	100%	\$677.60	\$0.00	\$0.00 \$677.60	
4	Mech. Technician II		\$1,472.00	\$0.00	\$0.00 \$1,472.00	
5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00 \$624.00	
1.8.3.1.4			Remove Hillma	no Dolloro	\$1,200,00	
					\$1,386.80	
_ ID	Resource Name		Work Delay	Start	Finish	
3	Mech. Engineer II	100%	8 hrs 0 days	Mon 8/15/05	Tue 8/16/05	
4	Mech. Technician II		32 hrs 0 days	Mon 8/15/05	Tue 8/16/05	
5	Mech. Technical Specialist	100%	8 hrs 0 days	Mon 8/15/05	Tue 8/16/05	
ID	Resource Name	Units	Cost Baseli	ine Cost Act.	Cost Rem. Cost	
3	Mech. Engineer II		\$338.80		\$0.00 \$338.80	
4	Mech. Technician II	400%	\$736.00	\$0.00	\$0.00 \$736.00	
5	Mech. Technical Specialist	100%	\$312.00	\$0.00	\$0.00 \$312.00	
1.8.3.1.5		Insta	all CMX 30 degree	e sections	\$2,773.60	
ID	Resource Name	Units	Work Delay	Start	Finish	
3	Mech. Engineer II	100%	16 hrs 0 days	Tue 8/16/05	Thu 8/18/05	
4	Mech. Technician II		64 hrs 0 days	Tue 8/16/05	Thu 8/18/05	
5	Mech. Technical Specialist		16 hrs 0 days	Tue 8/16/05	Thu 8/18/05	

WBS		Name			Cost		
	degree sections" continued						
ID	Resource Name	Units	Cost Bas	eline Cost A	ct. Cost	Rem. Cost	
3	Mech. Engineer II	100%	\$677.60	\$0.00	\$0.00	\$677.60	
4	Mech. Technician II	400%	\$1,472.00	\$0.00	\$0.00	\$1,472.00	
5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00	\$624.00	
1.8.3.1.6			Open	Endplugs	\$1,38	86.80	
<u>ID</u>	Resource Name	Units	Work Delay	Start	Finis		
3	Mech. Engineer II	100%	8 hrs 0 days	Thu 8/18/05	Fri 8/1		
4 5	Mech. Technician II	400% 100%	32 hrs 0 days 8 hrs 0 days	Thu 8/18/05 Thu 8/18/05	Fri 8/1 Fri 8/1		
_	Mech. Technical Specialist		-				
<u>ID</u>	Resource Name	Units				Rem. Cost	
3	Mech. Engineer II	100%	\$338.80		\$0.00	\$338.80	
4 5	Mech. Technician II Mech. Technical Specialist	400% 100%	\$736.00 \$312.00	•	\$0.00 \$0.00	\$736.00 \$312.00	
	Meon: redimined epecialist	10070					
1.8.3.1.7			Install North CN	· ·	\$1,38	86.80	
10							
<u>ID</u>	Resource Name	Units	Work Delay	Start	Finis		
3	Mech. Engineer II	100%	8 hrs 0 days	Fri 8/19/05	Mon 8/2	22/05	
3 4	Mech. Engineer II Mech. Technician II	100% 400%	8 hrs 0 days 32 hrs 0 days	Fri 8/19/05 Fri 8/19/05	Mon 8/2 Mon 8/2	22/05 22/05	
3 4 5	Mech. Engineer II Mech. Technician II Mech. Technical Specialist	100% 400% 100%	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05	Mon 8/2 Mon 8/2 Mon 8/2	22/05 22/05 22/05	
3 4 5 ID	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name	100% 400% 100% Units	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 ine Cost Act.	Mon 8/2 Mon 8/2 Mon 8/2 . Cost	22/05 22/05 22/05 Rem. Cost	
3 4 5 ID 3	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II	100% 400% 100% Units 100%	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel \$338.80	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 ine Cost Act. \$0.00	Mon 8/2 Mon 8/2 Mon 8/2 . Cost \$0.00	22/05 22/05 22/05 Rem. Cost \$338.80	
3 4 5 ID	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II	100% 400% 100% Units	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 ine Cost Act. \$0.00 \$0.00	Mon 8/2 Mon 8/2 Mon 8/2 . Cost	22/05 22/05 22/05 Rem. Cost	
3 4 5 ID 3 4 5	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II	100% 400% 100% Units 100% 400%	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel \$338.80 \$736.00 \$312.00	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 ine Cost Act. \$0.00 \$0.00 \$0.00	Mon 8/2 Mon 8/2 Mon 8/2 . Cost \$0.00 \$0.00 \$0.00	22/05 22/05 22/05 Rem. Cost \$338.80 \$736.00 \$312.00	
3 4 5 <u>ID</u> 3 4 5	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist	100% 400% 100% Units 100% 400% 100%	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel \$338.80 \$736.00 \$312.00	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 ine Cost Act. \$0.00 \$0.00 \$0.00	Mon 8/2 Mon 8/2 Mon 8/2 . Cost \$0.00 \$0.00 \$4,16	22/05 22/05 22/05 Rem. Cost \$338.80 \$736.00 \$312.00	
3 4 5 ID 3 4 5	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technicial Specialist Resource Name	100% 400% 100% Units 100% 400%	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel \$338.80 \$736.00 \$312.00 Insta	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 ine Cost Act. \$0.00 \$0.00 \$0.00	Mon 8/2 Mon 8/2 Mon 8/2 . Cost \$0.00 \$0.00 \$4,16 Fin	22/05 22/05 22/05 Rem. Cost \$338.80 \$736.00 \$312.00	
3 4 5 <u>ID</u> 3 4 5	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist	100% 400% 100% Units 100% 400% 100%	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel \$338.80 \$736.00 \$312.00 Insta	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 ine Cost Act. \$0.00 \$0.00 \$1.00	Mon 8/2 Mon 8/2 Mon 8/2 . Cost \$0.00 \$0.00 \$4,16 Fin	22/05 22/05 22/05 Rem. Cost \$338.80 \$736.00 \$312.00 50.40 iish	
3 4 5 <u>ID</u> 3 4 5 1.8.3.1.8 <u>ID</u> 3	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technician IS Mech. Technical Specialist Resource Name Mech. Engineer II	100% 400% 100% Units 100% 400% 100% Units 100%	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel \$338.80 \$736.00 \$312.00 Insta Work Delay 24 hrs 0 days	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 ine Cost Act. \$0.00 \$0.00 \$0.00 all pit steel Start Mon 8/22/05	Mon 8/2 Mon 8/2 Mon 8/2 . Cost \$0.00 \$0.00 \$4,16 Fin Thu 8/ Thu 8/	22/05 22/05 22/05 Rem. Cost \$338.80 \$736.00 \$312.00 50.40 sish 725/05	
3 4 5 <u>ID</u> 3 4 5 1.8.3.1.8 <u>ID</u> 3 4	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technician Specialist Resource Name Mech. Engineer II Mech. Engineer II Mech. Technician II Mech. Technician II Mech. Technician II Mech. Technical Specialist Resource Name	100% 400% 100% Units 100% 400% 100% Units 100% 400% 100% Units	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel \$338.80 \$736.00 \$312.00 Insta Work Delay 24 hrs 0 days 96 hrs 0 days 24 hrs 0 days Cost Basel	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 ine Cost Act. \$0.00 \$0.00 \$1.00 all pit steel Start Mon 8/22/05 Mon 8/22/05	Mon 8/2 Mon 8/2 Mon 8/2 . Cost \$0.00 \$0.00 \$4,16 Fin Thu 8/ Thu 8/ Thu 8/ ct. Cost	22/05 22/05 22/05 Rem. Cost \$338.80 \$736.00 \$312.00 30.40 sish 725/05 725/05 725/05 Rem. Cost	
3 4 5 ID 3 4 5 1.8.3.1.8 ID 3 4 5 ID 3	Mech. Engineer II Mech. Technician II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technician II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II	100% 400% 100% Units 100% 400% 100% Units 100% Units 100%	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel \$338.80 \$736.00 \$312.00 Insta Work Delay 24 hrs 0 days 96 hrs 0 days 24 hrs 0 days Cost Base \$1,016.40	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 Stri 8/19/05 Sine Cost Act. \$0.00 \$0.00 \$0.00 Start Mon 8/22/05 Mon 8/22/05 Mon 8/22/05 Meline Cost Act. \$0.00	Mon 8/2 Mon 8/2 Mon 8/2 . Cost \$0.00 \$0.00 \$4,16 Fin Thu 8/ Thu 8/ Thu 8/ Ct. Cost \$0.00	22/05 22/05 22/05 Rem. Cost \$338.80 \$736.00 \$312.00 50.40 sish /25/05 /25/05 /25/05 Rem. Cost \$1,016.40	
3 4 5 ID 3 4 5 1.8.3.1.8 ID 3 4 5 ID	Mech. Engineer II Mech. Technician II Mech. Technical Specialist Resource Name Mech. Engineer II Mech. Technician II Mech. Technician Specialist Resource Name Mech. Engineer II Mech. Engineer II Mech. Technician II Mech. Technician II Mech. Technician II Mech. Technical Specialist Resource Name	100% 400% 100% Units 100% 400% 100% Units 100% 400% 100% Units	8 hrs 0 days 32 hrs 0 days 8 hrs 0 days Cost Basel \$338.80 \$736.00 \$312.00 Insta Work Delay 24 hrs 0 days 96 hrs 0 days 24 hrs 0 days Cost Basel	Fri 8/19/05 Fri 8/19/05 Fri 8/19/05 Sri 8/19/05 ine Cost Act. \$0.00 \$0.00 \$0.00 all pit steel Start Mon 8/22/05 Mon 8/22/05 Mon 8/22/05 seline Cost Act.	Mon 8/2 Mon 8/2 Mon 8/2 . Cost \$0.00 \$0.00 \$4,16 Fin Thu 8/ Thu 8/ Thu 8/ ct. Cost	22/05 22/05 22/05 Rem. Cost \$338.80 \$736.00 \$312.00 30.40 sish 725/05 725/05 725/05 Rem. Cost	

WBS			Name			Cost	
1.8.3	.1.9			Install no	orth muon wall	\$6,934.00	
	ID	Resource Name	Units	Work De	elay Start	Finish	
	3	Mech. Engineer II	100%		days Thu 8/25/0	Thu 9/1/05	
	4	Mech. Technician II	400%	160 hrs 0 d	days Thu 8/25/0	Thu 9/1/05	
	5	Mech. Technical Specialist	100%	40 hrs 0 d	days Thu 8/25/0	Thu 9/1/05	
	ID	Resource Name	Units			ct. Cost Rem. Cost	
	3	Mech. Engineer II	100%	\$1,694.00	\$0.00	\$0.00 \$1,694.00	
	4	Mech. Technician II	400%	\$3,680.00	\$0.00	\$0.00 \$3,680.00	
	5	Mech. Technical Specialist	100%	\$1,560.00	\$0.00	\$0.00 \$1,560.00	
1.8.3.1	.10			Close	1200 ton door	\$2,773.60	
	ID	Resource Name	Units	Work Del	lay Start	Finish	
	3	Mech. Engineer II	100%	16 hrs 0 da	ays Thu 9/1/05	Tue 9/6/05	
	4	Mech. Technician II	400%	64 hrs 0 da		Tue 9/6/05	
	5	Mech. Technical Specialist	100%	16 hrs 0 da	ays Thu 9/1/05	Tue 9/6/05	
	ID	Resource Name	Units			ct. Cost Rem. Cost	
	3	Mech. Engineer II	100%	\$677.60	\$0.00	\$0.00 \$677.60	
	4	Mech. Technician II	400%	\$1,472.00	\$0.00	\$0.00 \$1,472.00	
	5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00 \$624.00	
1.8.3.1	44			la.	stall Miniplugs	\$2,773.60	
1.0.3.1							
	ID	Resource Name	Units	Work Del		Finish	
	3	Mech. Engineer II	100%	16 hrs 0 da		Thu 9/8/05	
	4	Mech. Technician II	400%	64 hrs 0 da		Thu 9/8/05	
	5	Mech. Technical Specialist	100%	16 hrs 0 da	ays Tue 9/6/05	Thu 9/8/05	
	ID	Resource Name	Units		Baseline Cost A	ct. Cost Rem. Cost	
	3	Mech. Engineer II	100%	\$677.60	\$0.00	\$0.00 \$677.60	
	4	Mech. Technician II	400%	\$1,472.00	\$0.00	\$0.00 \$1,472.00	
	5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00 \$624.00	
1.8.3.1	.12			Inst	all Beampipes	\$2,773.60	
	ID	Resource Name	Units	Work Del	lay Start	Finish	
	3	Mech. Engineer II	100%	16 hrs 0 da	,	Thu 9/15/05	
	4	Mech. Technician II	400%	64 hrs 0 da	,	Thu 9/15/05	
	5	Mech. Technical Specialist	100%	16 hrs 0 da	•	Thu 9/15/05	
			-		•		

WBS		Name			Cost				
"Install Beampip	es" continued								
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Co	st		
3	Mech. Engineer II	100%	\$677.60	\$0.00	•	\$677.6			
4	Mech. Technician II	400%	\$1,472.00	\$0.00		\$1,472.0			
5	Mech. Technical Specialist	100%	\$624.00	\$0.00	\$0.00	\$624.0	00		
1.8.3.1.13	Centr	al Detect	or Installed	in Collision Hall	\$	0.00			
1.8.3.2				ns and Checkout					
1.8.3.2.1		Con	nect AC Pov	wer to Detectors	•	00.88			
<u>ID</u>	Resource Name Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
4	Mech. Technician II 200%	16 hrs	0 days	Mon 8/15/05	Tue 8/16/05	\$368.00	\$0.00	\$0.00	\$368.00
1.8.3.2.2			Connect W	Vater and SUVA	\$52	24.00			
ID	Resource Name	Units	Work D	elay Start	: Fin	ish			
4	Mech. Technician II	200%	16 hrs 0	days Mon 8/15	5/05 Tue 8	/16/05			
5	Mech. Technical Specialist	50%	4 hrs 0	days Mon 8/15	5/05 Tue 8	/16/05			
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost			
4	Mech. Technician II	200%	\$368.00	\$0.00	\$0.00	\$368.00	_		
5	Mech. Technical Specialist	50%	\$156.00	\$0.00	\$0.00	\$156.00			
1.8.3.2.3			Connect I	Flammable Gas	\$52	24.00			
ID	Resource Name	Units	Work D	elay Start	Fin	ish			
4	Mech. Technician II	200%		days Mon 8/1	5/05 Tue 8	/16/05			
5	Mech. Technical Specialist	50%	4 hrs 0	days Mon 8/1	5/05 Tue 8	/16/05			
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Cost			
4	Mech. Technician II	200%	\$368.00	\$0.00	\$0.00	\$368.00			
5	Mech. Technical Specialist	50%	\$156.00	\$0.00	\$0.00	\$156.00			
1.8.3.2.4	Co	nnect So	lenoid and b	pegin cooldown`	\$7,86	0.00			
ID	Resource Name	Units	Work	Delay Sta	rt Fii	nish			
4	Mech. Technician II	200%	240 hrs (0 days Mon 8/	15/05 Tue	9/6/05			
5	Mech. Technical Specialist	50%	60 hrs (0 days Mon 8/	15/05 Tue	9/6/05			
ID	Resource Name	Units	Cost	Baseline Cost	Act. Cost	Rem. Co	st		
4	Mech. Technician II	200%	\$5,520.00	\$0.00	\$0.00	\$5,520.0	00		
5	Mech. Technical Specialist	50%	\$2,340.00	\$0.00	\$0.00	\$2,340.0	00		

WBS	Name Cost
1.8.3.2.5	Install muon wall water/cables/power \$2,620.00
ID	Resource Name Units Work Delay Start Finish
4	Mech. Technician II 200% 80 hrs 0 days Thu 9/1/05 Fri 9/9/05
5	Mech. Technical Specialist 50% 20 hrs 0 days Thu 9/1/05 Fri 9/9/05
ID	Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost
4	Mech. Technician II 200% \$1,840.00 \$0.00 \$1,840.00
5	Mech. Technical Specialist 50% \$780.00 \$0.00 \$780.00
1.8.3.3	Complete Silicon Installation \$10,872.00
1.8.3.3.1	Connect Si cooling and interlock cables \$1,048.00
ID	Resource Name Units Work Delay Start Finish
4	Mech. Technician II 200% 32 hrs 0 days Fri 8/19/05 Tue 8/23/05
5	Mech. Technical Specialist 50% 8 hrs 0 days Fri 8/19/05 Tue 8/23/05
ID	Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost
4	Mech. Technician II 200% \$736.00 \$0.00 \$0.00 \$736.00
5	Mech. Technical Specialist 50% \$312.00 \$0.00 \$0.00 \$312.00
1.8.3.3.2	Connect Silicon Cables to Detector \$3,312.00
ID	Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
4	Mech. Technician II 300% 144 hrs 0 days Tue 8/23/05 Wed 8/31/05 \$3,312.00 \$0.00 \$0.00 \$3,312.00
1.8.3.3.3	Connect Sil Rack Cables to Repeater Cards \$4,416.00
ID	Resource Name Units Work Delay Start Finish Cost Baseline Cost Act. Cost Rem. Cost
4	Mech. Technician II 300% 192 hrs 0 days Wed 8/31/05 Tue 9/13/05 \$4,416.00 \$0.00 \$0.00 \$4,416.00
1.8.3.3.4	Checkout Silicon Cooling and Interlocks \$2,096.00
ID	Resource Name Units Work Delay Start Finish
4	Mech. Technician II 200% 64 hrs 0 days Tue 8/23/05 Mon 8/29/05
5	Mech. Technical Specialist 50% 16 hrs 0 days Tue 8/23/05 Mon 8/29/05
ID	Resource Name Units Cost Baseline Cost Act. Cost Rem. Cost
4	Mech. Technician II 200% \$1,472.00 \$0.00 \$1,472.00
5	Mech. Technical Specialist 50% \$624.00 \$0.00 \$0.00
1.8.3.3.5	Silicon Readout Debugging \$0.00
1.8.3.3.6	Silicon Ready to be powered \$0.00

WBS			Name	Cost	
1.8.			ł	pare to Exit Collision Hall \$10,641.20	
1.8.3.	4.1			Close plugs \$2,773.60	
_	ID	Resource Name	Units	/ork Delay Start Finish	
	3	Mech. Engineer II	100%	6 hrs 0 days Thu 9/15/05 Mon 9/19/05	
	4	Mech. Technician II	400%	1 hrs 0 days Thu 9/15/05 Mon 9/19/05	
	5	Mech. Technical Specialist	100%	6 hrs 0 days Thu 9/15/05 Mon 9/19/05	
<u>-</u>	ID	Resource Name	Units	Cost Baseline Cost Act. Cost Rem. Cost	
	3	Mech. Engineer II	100%	\$677.60 \$0.00 \$0.00 \$677.60	
	4	Mech. Technician II	400%	1,472.00 \$0.00 \$0.00 \$1,472.00	
	5	Mech. Technical Specialist	100%	\$624.00 \$0.00 \$0.00 \$624.00	
1.8.3.	4.2			Solenoid checkout \$5,094.00	
	ID	Resource Name	Units	/ork Delay Start Finish	
-	3	Mech. Engineer II	100%) hrs 0 days Mon 9/19/05 Mon 9/26/05	
	4	Mech. Technician II	200%) hrs 0 days Mon 9/19/05 Mon 9/26/05	
	5	Mech. Technical Specialist	100%	hrs 0 days Mon 9/19/05 Mon 9/26/05	
	ID	Resource Name	Units	Cost Baseline Cost Act. Cost Rem. Cost	
-	3	Mech. Engineer II	100%	1,694.00 \$0.00 \$0.00 \$1,694.00	
	4	Mech. Technician II	200%	1,840.00 \$0.00 \$0.00 \$1,840.00	
	5	Mech. Technical Specialist	100%	1,560.00 \$0.00 \$0.00 \$1,560.00	
1.8.3.	4.3			Solenoid Powered \$0.00	
1.8.3.				Close Muon Steel \$2,773.60	
	ID	Resource Name	Units	ork Delay Start Finish	
-	3	Mech. Engineer II	100%	6 hrs 0 days Mon 9/19/05 Wed 9/21/05	
	4	Mech. Technician II	400%	hrs 0 days Mon 9/19/05 Wed 9/21/05	
	5	Mech. Technical Specialist	100%	6 hrs 0 days Mon 9/19/05 Wed 9/21/05	
_	ID	Resource Name	Units	Cost Baseline Cost Act. Cost Rem. Cost	
	3	Mech. Engineer II	100%	\$677.60 \$0.00 \$0.00 \$677.60	
	4	Mech. Technician II	400%	1,472.00 \$0.00 \$0.00 \$1,472.00	
	5	Mech. Technical Specialist	100%	\$624.00 \$0.00 \$0.00 \$624.00	
1.	8.4			Ready for Collisions \$0.00	

WBS				Name	۷				Cost			
	.8.5					Projec	t Managei	ment	\$50,820.00			
	ID	Resource Name	Unit	s Wo	ork	Delay	Start	Fi	nish			
	3	Mech. Engineer	II 1009	% 1,20	0 hrs	0 days	Thu 3/3/	05 Mon	10/3/05			
	ID	Resource Name	Unit	s C	Cost	Baseli	ine Cost	Act. Cost	Rem. Cost	t		
	3	Mech. Engineer	II 1009	% \$50,	820.00		\$0.00	\$0.00	\$50,820.00)		
	Note	es										
	Project	engineer										
	Will wr	ite JHA's, safety reviews	s, procedure	es, maintain	schedule	s, perform	ance reviews	s, preparing fo	r endless series	of reviews		
	1.9						Administr	ation S	\$466,480.00			
	Note	es							,			
	This s	ummary task covers all t	he administi	rative costs	associate	d with the	design and d	construction o	f the CDF Run III	o project.		
1	.9.1						Fiscal Y	'ears	\$0.00			
	Note											
	This s	ummary task will hold taq	gs for the Fi	scal years.								
1.9	.1.1					Fis	scal Year	2002	\$0.00			
1.9	.1.2					Fis	scal Year	2003	\$0.00			
	.1.3						scal Year		\$0.00			
	.1.4						scal Year		\$0.00			
	.1.5					FIS	scal Year		\$0.00			
1	.9.2						Design P	hase	\$65,500.00			
	Note This to	es sk covers all the adminis	etrative cost	e accoriate	nd with the	design nh	ase of the or	niect This ta	ek will he comple	te when the project ha	s haan hasalina	nd and received CD-3
			Strative cost	o account	e war are					ic when the project ha	o been baseline	a, and received GD 6.
1.9							Miscellan		\$50,500.00			
1.9.2	.1.1						n Managei	ment	\$40,000.00			
	<u>ID</u>	Resource Name			Delay	Sta		Finish	Cost	Baseline Cost		
	2	FNALR&D	0%	0 hrs	0 days	Mon 1	///02 M	lon 1/7/02	\$40,000.00	\$0.00	\$0.00	\$40,000.00
1.9.2	.1.2				Adr	ninistrat	tive comp	uting	\$10,500.00			
	ID	Resource Name			Delay	Sta		Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	2	FNALR&D	0%	0 hrs	0 days	Mon 1	/7/02 M	lon 1/7/02	\$7,000.00	\$0.00	\$0.00	\$7,000.00

WBS				Nam	ıe			Cost				
"Administr	ative (computing" continu	ed									
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	3	FNALCont	0%	0 hrs	0 days	Mon 1/7/02	Mon 1/7/02	\$3,500.00	\$0.00	\$0.00	\$3,500.00	
1.9	9.2.2						Travel	\$15,000.00				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	2	FNALR&D	0%	0 hrs	0 days	Mon 1/7/02	Mon 1/7/02	\$10,000.00	\$0.00	\$0.00	\$10,000.00	
	3	FNALCont	0%	0 hrs	0 days	Mon 1/7/02	Mon 1/7/02	\$5,000.00	\$0.00	\$0.00	\$5,000.00	
	Not	es		_								
	Cost A	Assumptions:										
		o Japan - \$5000 each to US vendors - \$1000 e	each									
1.3	9.2.3					Project receive	s CD-3	\$0.00				
	1.9.3					Construction	Phase \$	6400,980.00				
	Not	es		_								
	This s	ummary task covers the	administra	tive costs i	ncurred duri	ng the construction	phase of the pro	ject. It will be com	nplete when the constr	uction of all oth	er subprojects is complete.	
1 !	9.3.1					Miscell	aneous \$	6400,980.00				
1.9.3	3.1.1						Visitors	\$75,000.00				
1.9.3.	1.1.1					Silicon Mana	gement	\$75,000.00				
	ID	Resource Name	Units	Work	Delay	Start	Finish					
	1	FNALEQ	0%	0 hrs	0 days	Mon 10/10/05		. ,	•		0.00 \$50,000.00	
	3	FNALCont	0%	0 hrs	0 days	Mon 10/10/05	5 Mon 10/10	0/05 \$25,00	0.00 \$6	0.00 \$	0.00 \$25,000.00	
19:	3.1.2						Travel	\$90,000.00				
1.9.3.						Travel - F		\$15,000.00				
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost	
	1	FNALEQ	0%	0 hrs	0 days	Mon 1/7/02	Mon 1/7/02	\$10,000.00	\$0.00	\$0.00	\$10,000.00	
	3	FNALCont	0%	0 hrs	0 days	Mon 1/7/02	Mon 1/7/02	\$5,000.00	\$0.00	\$0.00	\$5,000.00	
	Not	es		=								

Cost Assumptions:

¹ trip to Japan - \$5000 each 5 trips to US vendors - \$1000 each

WBS				Nam	16			Cost			
1.9.3.				IVAII		Travel - F		30,000.00			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost	Act. Cost	Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Tue 10/1/02	Tue 10/1/02	\$20,000.00	\$0.00	\$0.00	\$20,000.00
	3	FNALCont	0%	0 hrs	0 days	Tue 10/1/02	Tue 10/1/02	\$10,000.00	\$0.00	\$0.00	\$10,000.00
	Not	es									
	Cost A	ssumptions:		•							
		o Japan - \$5000 each s to US vendors - \$1000	each								
1.9.3.	1.2.3					Travel - F	Y 2004 \$	30,000.00			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost	Baseline Cost		
	1	FNALEQ	0%	0 hrs	0 days	Wed 10/1/03		. ,	\$0.00		
	3	FNALCont	0%	0 hrs	0 days	Wed 10/1/03	Wed 10/1/03	3 \$10,000.00	\$0.00	\$0.00	\$10,000.00
	Not			_							
	Cost A	assumptions:									
		o Japan - \$5000 each s to US vendors - \$1000	each								
1.9.3.	1.2.4					Travel - F	Y 2005 \$	15,000.00			
	ID	Resource Name	Units	Work	Delay	Start	Finish	Cost Ba	aseline Cost A	ct. Cost F	Rem. Cost
	1	FNALEQ	0%	0 hrs	0 days	Fri 10/1/04		\$10,000.00	\$0.00		10,000.00
	3	FNALCont	0%	0 hrs	0 days	Fri 10/1/04	Fri 10/1/04	\$5,000.00	\$0.00	\$0.00	\$5,000.00
	Not			_							
	Cost A	assumptions:									
		o Japan - \$5000 each to US vendors - \$1000 e	each								
1.9.	3.1.3				A	Administrative :	support \$2	35,980.00			
	ID	Resource Name		Units	Worl	k Delay	Start	Finish			
	4	Computer Profess	sional V	100%	6,000	hrs 0 days	Tue 10/1/02	Mon 10/10/05	_		
	ID	Resource Name		Units	Co	st Baseli	ne Cost Act.	Cost Rem.	Cost		
	4	Computer Profess	sional V	100%				\$0.00 \$235,9			

WBS	Name		Cost		
"Administrative support" conti	nued				
Notes					
We need a better resou	rce here, but this is to cover two people, half time	e, for the duration of the proje	ect. The people are Carol (A	dmin. Assist.) and Dale (Fina	ncial specialist).
2		CPR2April10	3945,050.28		
3		tempDAQ \$1	,199,907.20		
4		EMTimingOct01	5204,480.00		
5			555,437.00		
6		AdminJan02 9	3466.480.00		